2010

Raymarine®

RADAR ▸ NAVIGATION AIDS ▸ INSTRUMENTS ▸ FISHFINDERS ▸ AUTOPILOTS ▸ COMMUNICATIONS ▸ SATELLITE TV ▸ LIFETAG ▸ SOFTWARE ▸ SYSTEMS ▸

Contents

FRONT COVER PHOTOS: JOE MCCARTHY; SUNSEEKER INTERNATIONAL LIMITED; FRAUSCHER; BENETEAU GROUP

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WELCOME

Smart on the inside, simple on the outside: that's the Raymarine advantage.

Our products combine industry-leading technology with intuitive design, to deliver a range that's ideally suited to the needs of today's boater – whether it's a round-the-world race or a weekend fishing trip.

We specialise in marine electronics. Backed up with years of research and customer feedback, this focus has allowed us to create a range that offers high performance and reliability, as well as exceptional ease of use: making sure you get the information you need quickly and easily.

And, backing it all up is Raymarine's service commitment: outstanding warranty and technical support – a worldwide network, providing total peace of mind wherever your boating takes you.

Welcome to Raymarine. Enjoy the advantage.

PHOTO: ALDENA YACHTING

SUGGESTED SYSTEMS

Whether you're fitting out a 17' fishing boat or a 100' cruiser, Raymarine has the equipment you need: single screen solutions or networked systems, with the performance and ease of use you expect from Raymarine.

Over the next few pages, you'll find suggested systems for powerboats and sailboats of various sizes; we understand that boat owners have their own particular preferences and each boat its own particular needs – we hope the systems will give you an idea of what is possible and provide you with an inspirational starting point to specify your own Raymarine system.

System diagram identification

- Radar arch installation
- Flybridge installation
- Main helm installation
- Below deck

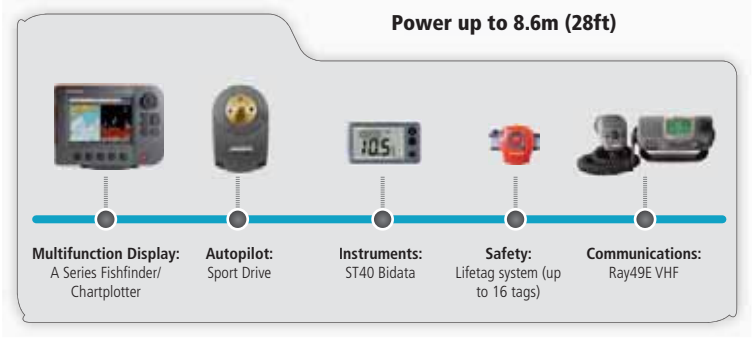


PHOTO: VIKSUND BÅT AS

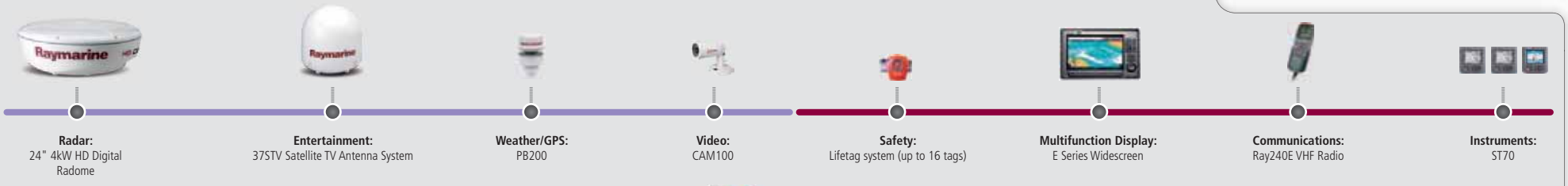
PHOTO: AQUADOR

PHOTO: SAGA BOATS AS

Power 8.6m (28ft) to 10.7m (35ft)

- **Radar:** 18" 4kW Digital Radome
- **Entertainment:** 33STV Satellite TV Antenna System
- **Instruments:** ST60+ Tridata and Wind
- **Autopilot Control:** ST6002 Control Head
- **Multifunction Display:** C Series Widescreen
- **Communication:** Ray218E VHF
- **Safety:** Lifetag system (up to 16 tags)
- **Autopilot Remote:** S100 Wireless Remote
- **Fishfinder:** DSM30 HD Digital Fishfinder Module
- **Safety:** AIS250 Receiver

Power 10.7m (35ft) to 15.4m (50ft)



- **Radar:** 24" 4kW HD Digital Radome
- **Entertainment:** 37STV Satellite TV Antenna System
- **Weather/GPS:** PB200
- **Video:** CAM100
- **Safety:** Lifetag system (up to 16 tags)
- **Multifunction Display:** E Series Widescreen
- **Communications:** Ray240E VHF Radio
- **Instruments:** ST70

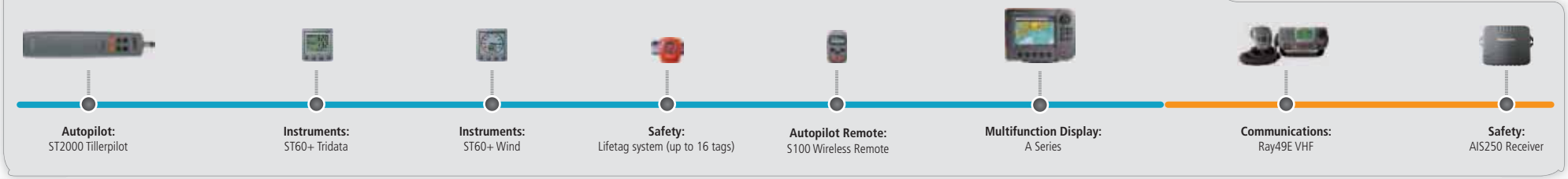
- **Instruments:** ST70
- **Multifunction Display:** E Series Widescreen
- **Keyboard:** Compact Keyboard
- **Multifunction Display:** E Series Widescreen
- **Software:** RayTech
- **Remote Control:** Wireless Smartcontroller
- **Entertainment:** Satellite TV control unit
- **Communications:** Ray240E VHF Radio
- **Fishfinder:** DSM300 HD Digital Fishfinder Module
- **Video:** CAM100
- **Safety:** AIS500 Transceiver

Power over 15.4m (50ft)

- **Entertainment:** 60STV Satellite TV Antenna System
- **Radar:** Super HD Digital Open Array
- **Weather/GPS:** PB200
- **Safety:** Lifetag system (up to 16 tags)
- **Video:** CAM100
- **Communications:** Ray240E VHF Radio
- **Remote Control:** Wireless Smartcontroller
- **Multifunction Display:** G Series Monitors
- **Keyboard:** G Series Command Centre
- **Autopilot Control:** ST70+ Display and Keypad
- **Instruments:** ST70+ Displays

- **Autopilot Control:** ST70+ Display and Keypad
- **Instruments:** ST70+ Displays
- **Multifunction Display:** Glass Bridge
- **Keyboard:** G Series Command Centre
- **Entertainment:** Satellite TV control unit
- **Software:** RayTech
- **Entertainment:** GVM400 Video Hub
- **Processor:** GPM400 Processor (x2)
- **Communications:** Ray240E VHF Radio
- **Fishfinder:** DSM400 HD Digital Module
- **Video:** CAM100
- **Safety:** AIS500 Transceiver

Sail up to 8.6m (28ft)

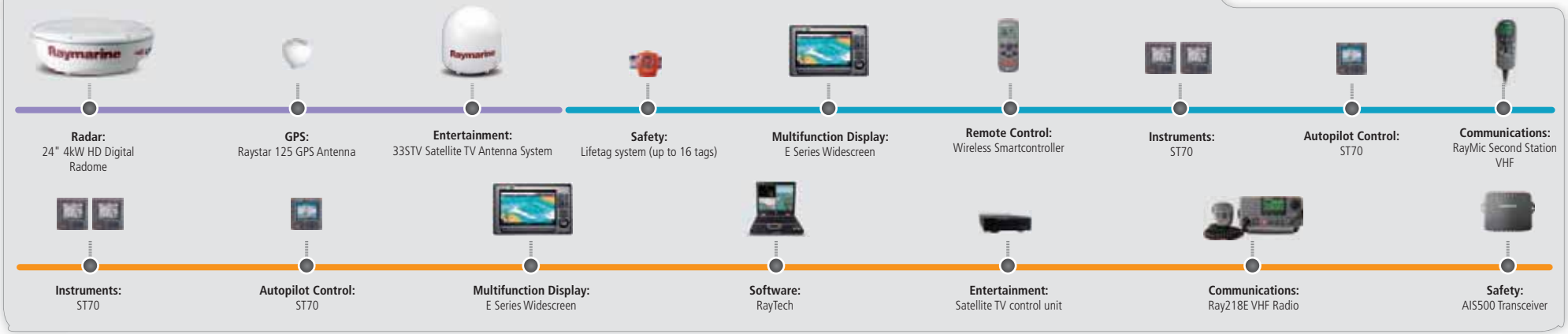


- **Autopilot:** ST2000 Tillerpilot
- **Instruments:** ST60+ Tridata
- **Instruments:** ST60+ Wind
- **Safety:** Lifetag system (up to 16 tags)
- **Autopilot Remote:** S100 Wireless Remote
- **Multifunction Display:** A Series
- **Communications:** Ray49E VHF
- **Safety:** AIS250 Receiver

Sail 8.6m (28ft) to 10.7m (35ft)

- **Radar:** 18" 4kW Digital Radome
- **Safety:** Lifetag system (up to 16 tags)
- **Instruments:** ST60+ Tridata
- **Autopilot Control:** ST6002 Control Head
- **Instruments:** ST60+ Wind
- **Multifunction Display:** C Series))screen
- **Remote Control:** Wireless Smartcontroller
- **Communications:** RayMic Second Station VHF
- **Communications:** Ray55E VHF
- **Safety:** AIS250 Receiver
- **Instruments:** ST60+ Graphic

Sail 10.7m (35ft) to 15.4m (50ft)



- **Radar:** 24" 4kW HD Digital Radome
- **GPS:** Raystar 125 GPS Antenna
- **Entertainment:** 33STV Satellite TV Antenna System
- **Safety:** Lifetag system (up to 16 tags)
- **Multifunction Display:** E Series Widescreen
- **Remote Control:** Wireless Smartcontroller
- **Instruments:** ST70
- **Autopilot Control:** ST70
- **Communications:** RayMic Second Station VHF
- **Instruments:** ST70
- **Autopilot Control:** ST70
- **Multifunction Display:** E Series Widescreen
- **Software:** RayTech
- **Entertainment:** Satellite TV control unit
- **Communications:** Ray218E VHF Radio
- **Safety:** AIS500 Transceiver

PHOTO: JOE MCCARTHY

PHOTO: SWEDEN YACHTS

System diagram identification

- Above deck installation
- Cockpit installation
- Below deck/chart table installation

PHOTO: SUNBEAM YACHTS

PHOTO: NAUTIVANVET AB

PHOTO: ETAP

Sail over 15.4m (50ft)

Radar:
24" 4kW HD Digital Radome

GPS:
Raystar 125 GPS Antenna

Entertainment:
45STV Satellite TV Antenna System

Video:
CAM100

Instruments:
ST70+ Displays

Safety:
Lifetag system (up to 16 tags)

Multifunction Display:
G Series Monitors

Keyboard:
G Series Compact

Remote Control:
Smartcontroller

Communications:
Ray240E VHF Radio

Autopilot Control:
ST70+ Display and Keypad

Instruments:
ST70+ Displays and Keypad

Instruments:
ST70+

Autopilot Control:
ST70+

Multifunction Display:
G Series monitor

Keyboard:
G Series Command Centre

Software:
RayTech

Communications:
Ray240E VHF Radio

Entertainment:
Satellite TV control unit

Entertainment:
G Series GVM400 Video Hub

Video:
CAM100

Processor:
G Series GPM400 Processor (x2)

Safety:
AIS500 Transceiver

MULTIFUNCTION DISPLAYS

G Series premium network navigation system
G Series is a complete multifunction helm solution that offers unmatched navigation visualisation capabilities and versatility. Combine ultra bright displays, networked processing and premium sensors to create the custom solution that is right for you.

E Series Widescreen HybridTouch network displays
Our most advanced and easy-to-use multifunction displays, E Series Widescreen is the next chapter in Raymarine navigation technology. Beneath the bold new styling is a brand new and incredibly easy-to-use interface, engineered with HybridTouch technology.

C Series Widescreen single or dual-station displays
C Series Widescreen expands the power of multifunction navigation with larger, brilliant displays, increased performance, expanded networking and video integration.

A Series single or dual-function chartplotter/ fishfinder displays
Harness the power of Raymarine's advanced engineering and exclusive technologies with the A Series dual function displays. With A Series you can navigate like a pro using high resolution 2D or 3D and aerial photo charts, and you can target fish with unprecedented clarity using Raymarine's unmatched HD Digital sonar technology.

Embedded cartography
G Series, E Series Widescreen, C Series Widescreen and A Series are available with Navionics ready-to-navigate cartography pre-installed.

PHOTO: © JOE MCCARTHY

MULTIFUNCTION DISPLAY FEATURES	A SERIES	C SERIES WIDESCREEN	E SERIES WIDESCREEN	G SERIES
Display				
Display sizes in inches	5.0, 5.7 and 6.4	9, 12.1 and 14.1	9, 12.1 and 14.1	12, 15, 17 and 19
Colour LCD display	●	●	●	●
Display resolution (pixels)	640x480	1280x800 and 800x480	1280x800 and 800x480	1024x768 and 1280x1024
Touchscreen operation			●	
Dedicated function keys and intuitive on-screen soft key functionality	●	●	●	●
Customisable screens to display the information you want to see	●	●	●	●
Chartplotter				
Support for Navionics cartography (available on Compact Flash memory cards)	●	●	●	●
Ready-to-navigate cartography pre-installed	●	●	●	●
Macro region Navionics Platinum cartography pre-installed				●
GPS sensor	Built-in	Built-in	External required	External required
Radar				
Compatible with optional Raymarine 4kW Digital and HD Digital Radomes and 4kW and 12kW HD and Super HD Digital Open Arrays		●	●	●
Bird mode*		●	●	●
48rpm*		●	●	●
Fishfinder				
Display fishfinder information with optional Raymarine external HD Digital DSM fishfinder modules		●	●	●
HD Digital sounder module built-in	Selected models			
General				
Dual or multiple display networking capabilities		Dual	Multiple	Multiple
Support for AIS target tracking with optional AIS250 receiver or AIS500 transceiver	●	●	●	●
Display video from observation cameras or TV / video entertainment systems		●	●	●
Easy integration with SeaTalk instruments and autopilots	Via NMEA 0183 connector	●	●	●
Operating voltage range (volts DC)	10.7 – 18	10.7 – 32	10.7 – 32	10.7 – 32
NavTex compatibility	●	●	●	●

*With HD Digital dome and SHD open array only

NEW E SERIES HYBRIDTOUCH™ – A TOUCH OF GENIUS!

PHOTO: VIKSUND BÅT AS

The best of both worlds!
The all new E Series Widescreen range raises the bar in multifunction navigation displays through elegant simplicity, bold new styling and unprecedented choice.

E Series HybridTouch displays offer the best of both worlds – traditional hard key operation or quick and slick touch-screen functionality.

Scrolling, panning, function selection and every-day navigation essentials are literally at your finger tips. Use the touch screen for quickness and ease in calm conditions or revert to hard keys when the rain starts pouring and the going gets rough.

Key features

- **HybridTouch™ Touch screen and keypad controls** provide easy and flexible control in all weather conditions.
- **Home screen.** Simple application selection and page customisation.
- **Refined interface** with easy to learn functions, visually dynamic graphics and intuitive menus.
- **Ready to navigate** with Navionics cartography pre-installed.
- **Anti-collision alarm.**
- **Customisable alerts** for shallow water and charted hazards.

Applications: Icon driven home screen makes application selection a breeze.

PHOTO: JEANNEAU (BENETEAU GROUP)

Key features continued...

NEW

- **High bright display** provides superior visibility and maximum screen size in the smallest possible footprint.
- **Built in tutorial** gives instant access to quick reference and training materials.
- **Integrated anti-glare LCD** with superior optics.
- **Smooth, easy glide surface** offers durable scratch resistance.
- **Touch Lock** ensures no false touches in extreme conditions.
- **Bold and friendly icons** make learning and exploring easy.
- **Home screen can be personalised** with your favourite applications and screen combinations.
- **Up to 4 video inputs and 1 output** with optional accessory cable.
- **Supports high speed radar scanning** automatically engages for optimum tracking of high speed targets at close range.
- **Supports HD Digital bird mode** helps find more fish by detecting and tracking sea birds with your HD Digital radar scanner.

PHOTO: SESSA MARINE

hybridtouch.com

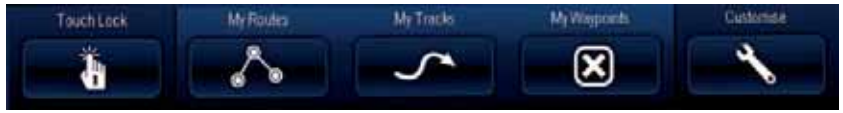
Visit www.HybridTouch.com for more product information and to watch the HybridTouch video overview.

hybridtouch.com

Visit www.HybridTouch.com for more product information and to watch the HybridTouch video overview.

Chart panning
Panning across charts is so simple with E Series HybridTouch – touch the screen and then drag the chart in the direction you want to go.

Menu bar: easy access to common functions.



NAVIONICS Gold NAVIONICS Platinum NAVIONICS Platinum+

Soft key operation
Intuitive soft key menus provide easy access to essential navigation functions.

Hard keys
Hard keys provide full operation control in rough seas.

Cartography and Navigation

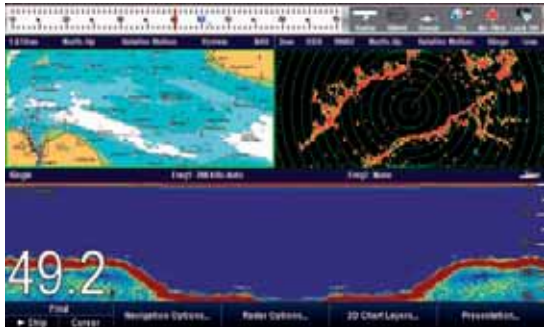
E Series HybridTouch comes with Navionics ready-to-navigate cartography pre-installed. Upgrade to Navionics Gold, Platinum or Platinum+ chart cards for the latest charting including 3D, aerial photo overlays and detailed port information.

The combination of touch screen and great cartography takes ease of navigation to a whole new level;

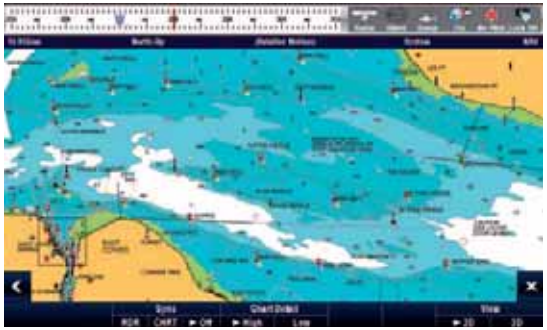
- Seamless 2D to 3D chart transitions.
- Smooth panning and zooming.
- Rotation and Pitch
- Top-down photo overlay
- Real time overlay of navigation data on 3D profiles
- Depth and elevation shadowing
- Quick and easy waypoint naming
- Simple touch-by-touch manual route building

Navionics Cartography

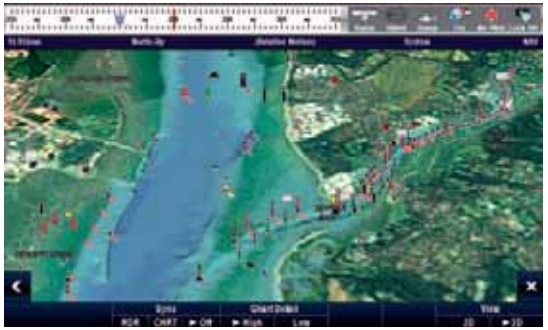
- Compatible with Navionics Gold, Platinum and Platinum+ charts.
- TurboView chart engine.



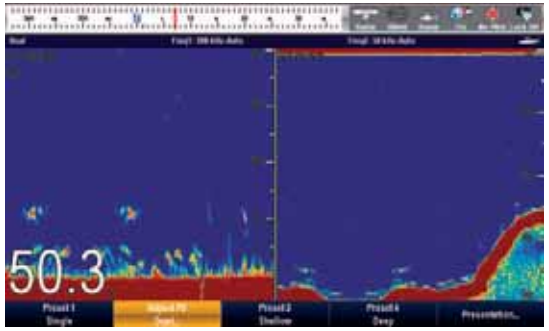
Customisable. Easily create custom screen configurations to display the information you want.



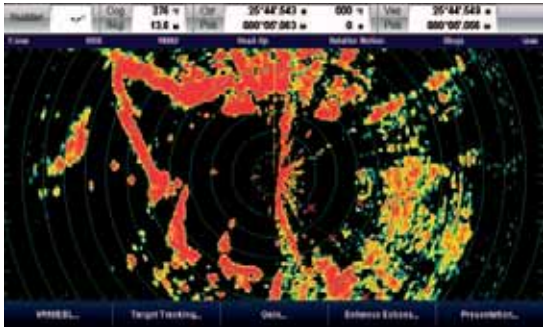
Built in cartography. E Series Widescreen comes with Navionics ready-to-navigate cartography pre-installed.



Cartography upgrades. Upgrade to Navionics Gold, Platinum or Platinum Plus for more detail and features.



Fishfinder. View HD Digital fishfinder data full screen or split with dual frequency windows.



HD Digital radar. View HD or Super HD Digital radar images.

Engine data. View engine information, such as rpm, oil, fuel and boost.

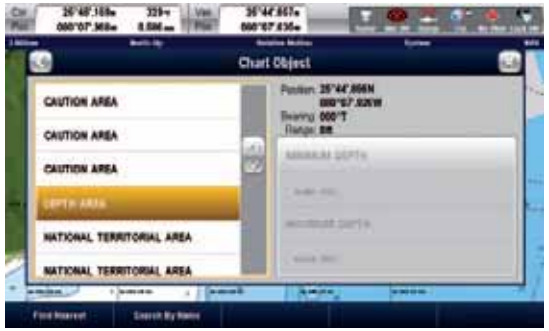


Chart and navigation information. View chart object and navigation data in a touch.

Touch screen keypad. Easily edit waypoint and route data using the touch screen keypad.

Tutorials. E Series Widescreen comes with tutorials built-in.

Multi display networking

SeaTalk^HS

In its base network configuration, its possible to create a SeaTalk^HS network with up to 5 E Series HybridTouch displays. For larger systems, the network can be expanded to 8 nodes by using 5 E Series HybridTouch displays and 3 SeaTalk network sensors, eg, DSM Sounder Module and radar antennas.

SeaTalk^HS network sensors compatible with E Series Widescreen displays include:

- HD and Super HD Digital open array radar antennas – go to page 34 to 41.
- Digital and HD Digital Radome radar antennas – go to page 34 to 41.
- HD Digital fishfinder modules – go to page 42 to 47.

SeaTalk^NG

The SeaTalk^NG network enables simple interconnection of multiple ST70 or ST70+ instruments, transducers and NMEA 2000 compatible devices.

PHOTO: JEANNEAU (BENETEAU GROUP)

PHOTO: MALO YACHTS AB

PHOTO: WINDY BOATS AS

PHOTO: CRANCHI

hybridtouch.com

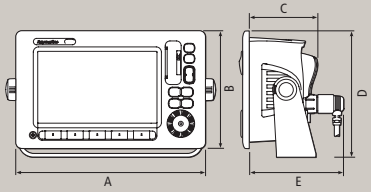
Visit HybridTouch.com for more product information and to watch the HybridTouch video overview.

E SERIES WIDESCREEN SPECIFICATIONS

Nominal voltage	12V and 24V DC systems
Absolute voltage range	10.7 – 32V DC
Power consumption	E90W: 23W; E120W: 35W and E140W: 37W (at full brightness)
Weight inc. optional bracket kg (lbs)	E90W: 3.85 (8.5); E120W: 4.76 (10.5); E140W: 5.58 (12.3)
Display type	Colour LCD touchscreen
Display resolution	E90W: 640x480 pixels (VGA) E120W: 1280x800 pixels (XGA) E140W: 1280x800 pixels (XGA)
LCD Display size	E90W: 229mm (9") E120W: 307mm (12.1") E140W: 358mm (14.1")
Display lighting	E90W: CCFL /800 Nits E120W/E140W: CCFL /1000 Nits
Connections	SeaTalk^{HS} (x1); SeaTalk (x1) SeaTalk^{NG} / NMEA 2000 (x1) Composite video input (PAL/NTSC) (x4) – optional cable required for 3x Video (VGA) output (x1) – optional cable required NMEA 0183 input (x3) NMEA 0183 output (x2) Alarm output (x1) Alarm line output – optional cable required

ORDERING INFORMATION

E62220-EU	E90W multifunction display (European version)
E62220-RW	E90W multifunction display (Rest of World version)
E62220-US	E90W multifunction display (US version)
E62223-EU	E120W multifunction display (European version)
E62223-RW	E120W multifunction display (Rest of World version)
E62223-US	E120W multifunction display (US version)
E62226-EU	E140W multifunction display (European version)
E62226-RW	E140W multifunction display (Rest of World version)
E62226-US	E140W multifunction display (US version)
A62132	E90W trunnion mount kit
A62133	E120W trunnion mount kit
A62134	E140W trunnion mount kit
A62158	E Series video I/O cable



Dimensions (mm)

E90	A: 317	B: 197	C: 113	D: 211	E: 156
E120	A: 380	B: 245	C: 113	D: 260	E: 156
E140	A: 424	B: 277	C: 113	D: 291	E: 156

G SERIES MULTIFUNCTION NAVIGATION – POWER AND VERSATILITY AT ITS BEST

G Series is a complete multifunction navigation and entertainment solution that offers unmatched visualisation capabilities and versatility. Combine ultra bright displays, networked processing and premium sensors to create the custom solution that is right for you.

More than just navigation, G Series is a total onboard information and command system with unmatched input possibilities.

Raymarine's premier navigation system, G Series Ultra High Performance Network features;

Performance

At the heart of every G Series system is the powerful GPM400 Processor which has 10 times the processing speed of conventional marine electronics. Super-fast PC-like performance with the reliability of an embedded navigation device and multiple processor modules that can be networked together.

The GPM400 comes with entire geographic Navionics Platinum regions pre-installed on its internal hard drive enabling you to make the most of 3D cartography, aerial photo chart overlays, enhanced port services, panoramic port photos and animated tides and currents.

Networking

The super-fast 100 megabit SeaTalk***HS*** network enables plug and play integration of multiple processor modules, marine displays and navigation stations. The SeaTalk***NG*** next generation data bus is the robust CAN-based data backbone that integrates Raymarine SeaTalk***NG*** instruments and NMEA 2000 compatible engine, generator and instrument systems.

PHOTO: SUNSEEKER INTERNATIONAL LTD

PHOTO: OYSTER MARINE LTD (UK)

Displays

Choice of Glass Bridge and ultra bright sunlight viewable displays for high-resolution navigation data and imagery. View 3D charts, radar, fishfinder and video in absolute clarity; resolutions up to 1280 x 1024 (SXGA).

Command Centre Keyboard and Compact Keyboard

Each G Series component intelligently networks with one another. The entire system can be controlled by the easy-to-use G Series control keyboard. Wired or wireless, the G Series keyboard controls single or multiple G Series navigation stations. The Compact Keyboard is the ideal solution to space-limited G Series installations.

HD Digital and Super HD Digital Radar Antennas

G Series supports Raymarine's new HD and Super HD Digital Radar Technology. HD Digital Radar's advanced Digital Signal Processing (DSP) effectively delivers the performance of a much larger, higher powered radar antenna. Go to pages 34–41.

HD Digital Fishfinders

G Series utilises Raymarine's most powerful patented HD Digital fishfinder technology using the ultra high-performance DSM400 Digital Sounder Module. Go to pages 42–47.

PHOTO: SUNSEEKER INTERNATIONAL LTD

PHOTO: © JOE MCCARTHY

Equipped with 4 independent sonar transceivers and up to 3kW of output power, the DSM400 sets the new standard in fishfinder performance for the serious sport fisherman. Alternatively, lower output power is available using the DSM300 (12/24v) or the DSM30 (12v only) Digital Sounder Modules.

Camera Integration

The GVM400 video module enables up to 4 simultaneous video streams from any display system. Raymarine's SeaTalk^{HS} network gives simultaneous access to every onboard video source from multiple G Series navigation stations. Go to pages 52–53.

AIS250 Receiver and AIS500 Transceiver

Operating in the VHF maritime band, the AIS system enables the wireless exchange of navigation status between vessels and shore-side traffic monitoring centres. Commercial ships, ocean-going vessels and other boats equipped with AIS transmitters broadcast AIS messages that include the vessel's name, course, speed and current navigation status. The AIS250 receives data and the AIS500 receives and transmits data. Go to pages 50–51.

Glass Bridge Monitors NEW

G Series Monitors

Built around a rugged aluminium chassis for strength and durability, the G Series low-profile monitors exude quality. Choose from G120 12", G150 15", G170 17" and G190 19" ultra bright LCD displays.

Glass Bridge Monitors

Raymarine's 15" and 17" glass bridge monitors are designed for owners / captains of 40' – 80' luxury cruising and sports fishing yachts that demand the best and most technologically advanced marine electronics.

FEATURES COMPARISON	G SERIES	GLASS BRIDGE
12" 1024 x 768 pixels (XGA)	●	
15" 1024 x 768 pixels (XGA)	●	●
17" 1280 x 1024 pixels (SXGA)	●	●
19" 1280 x 1024 pixels (SXGA)	●	
Adjustable backlighting for all lighting conditions	●	●
Superb visibility in low-light conditions	●	●
Night mode that dims to red	●	●
High contrast with optimal direct sunlight visibility	●	●
Condensation prevention bonded glass	●	●
Anti-reflective glass filter	●	●
Video inputs: 3 VGA, 2 DVI, 3 composite video and 1 S-Video	●	●
Access video input sources via keys located on the bezel	●	
Remote control using the G Series Keyboards	●	●
Shortcuts to brightness, night mode and PIP (picture in picture)	●	●
Resize and reposition PIP anywhere on the display	●	●
On-screen display menus for advanced display management	●	●

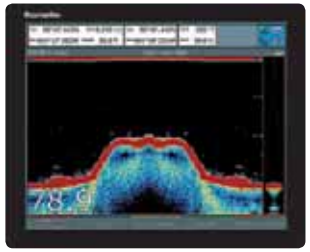
PHOTO: SUNSEEKER INTERNATIONAL LTD

G Series G120

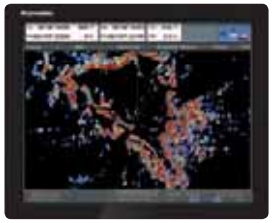
G Series G150

G Series G170

G Series G190



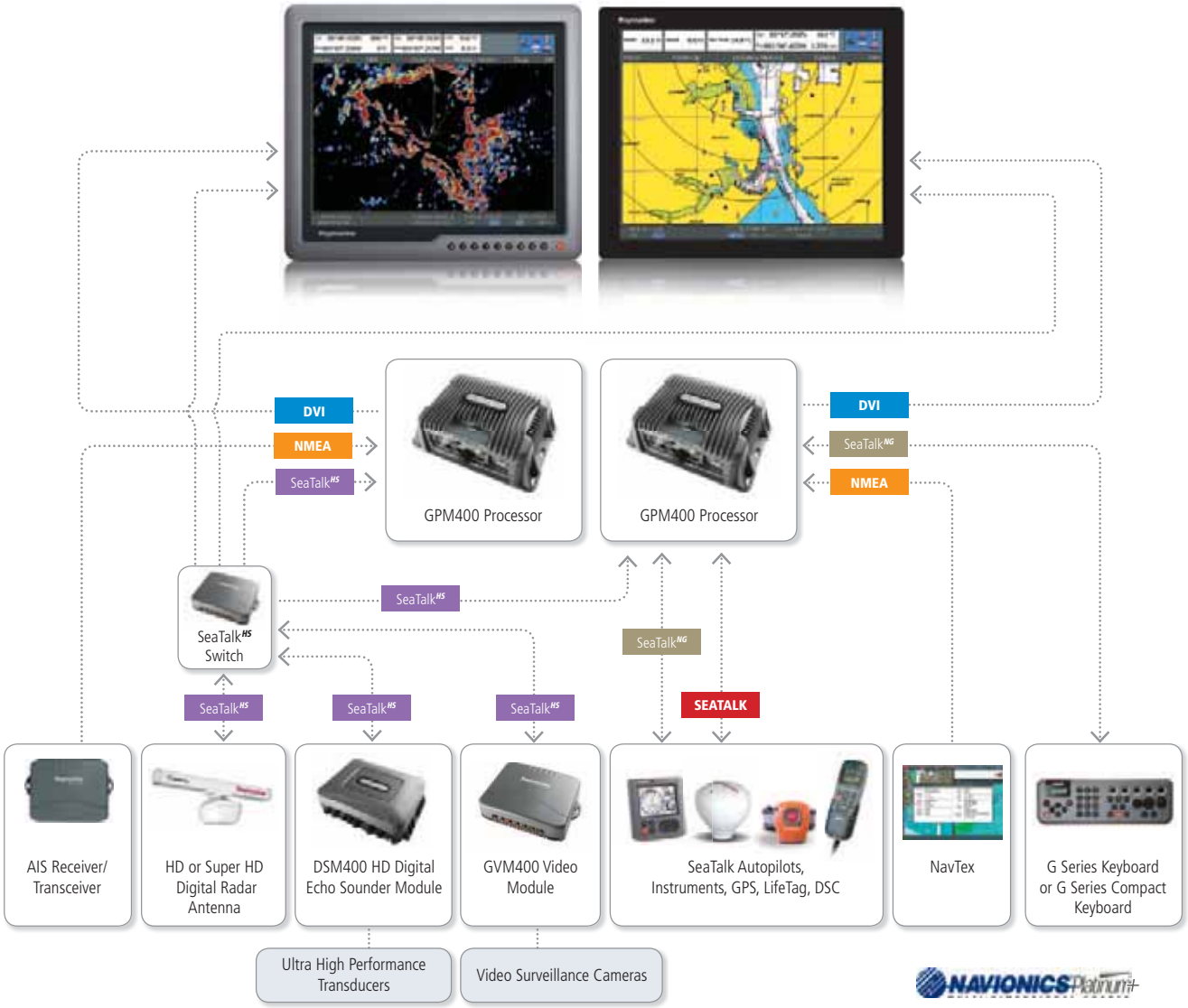
Glass Bridge 17"



Glass Bridge 15"

G Series system over view

This diagram gives an overview of the G Series system possibilities; the number of configurations available are almost endless. For detailed information and advice on tailoring a system to your exact requirements, please contact your nearest Raymarine stockist. To find your nearest Raymarine stockist please use the Dealer locator on **www.raymarine.com**



GPM400 Processor

The GPM400 Processor Module features include:

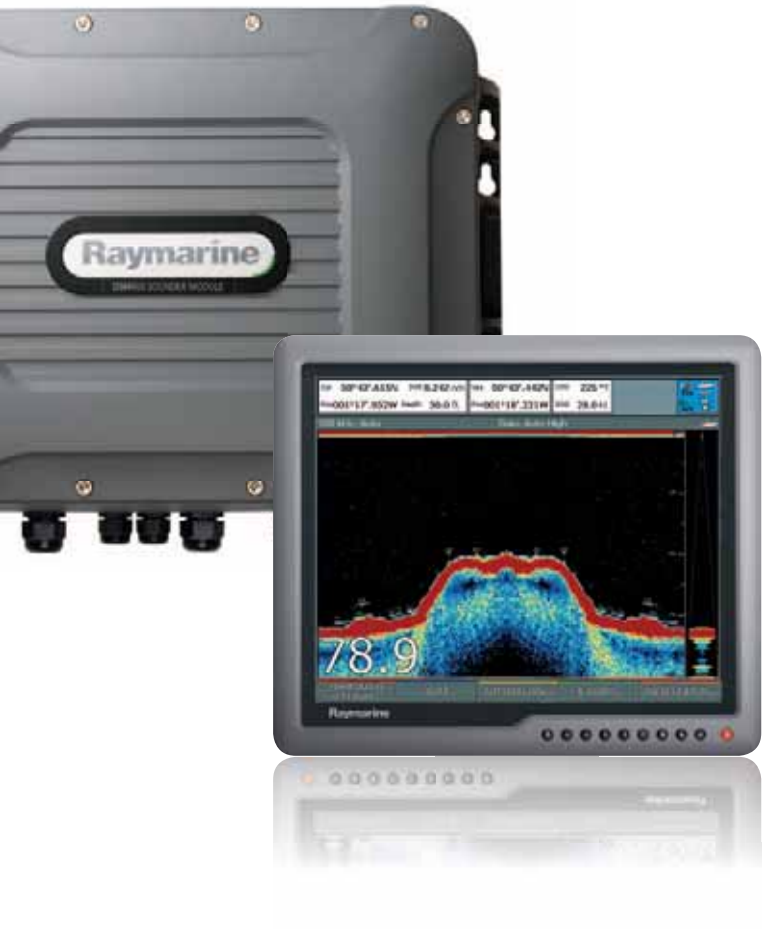
- High-speed processor.
- Entire Navionics Gold worldwide cartography library loaded on internal hard drive of GPM400.
- Three unique GPM400 models pre-loaded with the Navionics Platinum US, Europe or Rest of World regions.
- Compact Flash Navionics charts available for areas outside the pre-loaded cartography region.
- Platinum cartography features includes: 3D cartography, aerial photo chart overlays, enhanced port services, panoramic port photos and animated tides and currents.
- 2 high resolution DVI outputs (up to 1280 x 1024 pixels) for connection of high resolution monitors/displays.
- SeaTalk^{HS} 100Mb network ethernet port.
- SeaTalk port for connecting Raymarine instruments, autopilots and GPS.
- SeaTalk^{NG}/NMEA 2000 port.
- 2 NMEA 0183 input and output ports for connecting NMEA compatible marine equipment such as NavTex and AIS collision avoidance receivers/ transceivers.

NAVIONICS Platinum+ NAVIONICS Platinum NAVIONICS Gold

HD DIGITAL

DSM400 HD Digital Sounder Module

High definition HD Digital echo sounder technology offers unrivalled clarity and detail below the waves. See and target individual fish. Observe the sea bed structure in detail unimaginable with traditional sounder technology. The DSM400 is Raymarine's latest next generation HD Digital sounder processor.



G Series keyboards

Wired or wireless, the intuitive G Series Command Centre Keyboard provides an elegant interface to all points on the network. Additionally, the Compact Keyboard is available for space-limited installations.

Command centre keyboard

- Controls single or multiple G Series displays. LCD identifies the monitor under control.
- Can be interfaced with multiple GPM400 processors.
- Alphanumeric keypad for editing/entering data, such as waypoint names.
- Intuitive colour-coded softkeys select corresponding functions identified by on-screen labels.
- Dedicated autopilot control keys.
- Dedicated function keys for instant access to frequently used features.
- Twist 'n' click to edit alphanumeric values and fast scrolling of lists and menus.
- Trackpad to control the on-screen cursor and also scroll menus.
- Range key to zoom in and out on chart and radar screens to reveal more detail and information.
- Wired keyboard as standard (wireless option available).

GVM400 Video Module

The GVM400 video module distributes composite video using the Raymarine SeaTalk^{HS} network.

- Enables composite video to be viewed within a G Series application window.
- Channels multiple video inputs e.g. security/surveillance cameras into a single source.
- Add a second GVM400 video module to monitor and network up to 8 cameras.

G Series compact keyboard

Small yet powerful, the G Series Compact Keyboard offers G Series control while utilising a minimum amount of dash space. The new Compact Keyboard retains core G Series functionality while providing a clean unobtrusive appearance in a reduced footprint.

- Control up to four GPM400 processor and four G Series displays.
- LED indicators identify which display is in use and radar status.
- Intuitive colour coded softkey interface.
- Mix and match Compact Keyboard and Command Centre Keyboard on any G Series system.


8.2
13.1

HD Digital and Super HD Digital Radar

Perfect for the new G Series, the Raymarine Super HD Digital and HD Digital radar antennas deliver unmatched performance and ease-of-use. Maximising digital radar receiver performance, HD Digital Radar technology enables Raymarine radars to deliver target detection to rival much larger and more powerful radar systems.

G Series and Glass Bridge Dimensions

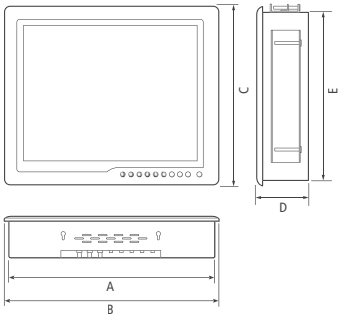
G120
A: 307mm
B: 330mm
C: 284mm
D: 118mm
E: 257mm

G150
A: 357mm
B: 380mm
C: 315mm
D: 118mm
E: 292mm

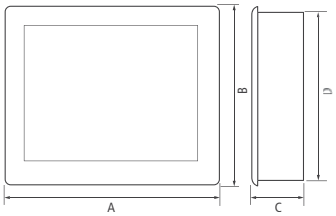
G190
A: 432mm
B: 454mm
C: 388mm
D: 118mm
E: 366mm

G170
A: 394mm
B: 415mm
C: 358mm
D: 118mm
E: 335mm

G Series Monitors



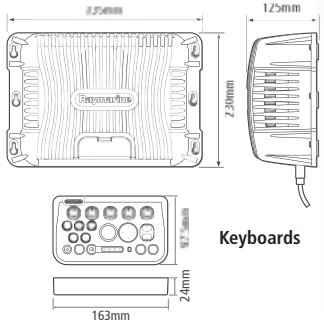
Glass Bridge Monitors



15"
A: 356mm
B: 280mm
C: 89mm
D: 264mm

17"
A: 390.5mm
B: 323mm
C: 101mm
D: 308mm

GPM400



Keyboards

GVM400

PHOTO: SEALINE INTERNATIONAL LTD

G SERIES SPECIFICATIONS

DISPLAYS	**Power supply**	12V and 24V systems
	Power consumption (amps)	G120/G150 4A at 12V DC and 2A at 24V DC G170/G190 7.6A at 12V DC and 3.5A at 24V DC
	Display sizes	G120: 12", G150: 15", G170: 17" and G190: 19"
	Backlighting	100 levels
	Weight kg (lbs)	G120: 4.6 (10), G150: 5.8 (12) G170: 6.4 (14) G190: 7.3 (16)
	Mounting method	panel mount only
	Display resolution (pixels)	G120/G150: 1024x768, G170/G190: 1280x1024 (supports resolutions up to 1600x1200 with built-in scaler)
	Inputs	3x VGA, 2 DVI, 3x composite video and 1x S-Video
GPM400	**Power supply**	12V and 24V systems
	Operating voltage	10.7 – 32V DC
	Power consumption (amps)	3A at 12V, 1.5A at 24V (no external loads 5A at 12V, 2.5A at 24V (external loads)
	Weight kg (lb)	6.5 (14.3)
	Connections	Data: NMEA 0183 x2, SeaTalk, SeaTalk***NG***, SeaTalk***HS*** Compact Flash, USB (software upgrade only). Video: DVI x2 (optional VGA adaptor available) Audio: stereo line out (rated 1V RMS)
GVM400	**Power supply**	12V and 24V systems
	Power consumption (amps)	650mA at 12V, 330mA at 24V
	Weight kg (lb)	0.8 (1.76)
	Connections	Data: SeaTalk***HS***, Video: inputs 1-3: composite video (PAL 626 line, NTSC 525 line). Input 4: S-Video or composite video Audio: stereo audio line in (rated 1V RMS) associated with input 4 (S-Video or composite)
KEYBOARDS	**Power supply**	12V system (from SeaTalk***NG*** bus)
	Power consumption	Command Centre: 1.5W, Compact: 150mA
	Connections	Command Centre: SeaTalk***NG***, SeaTalk RF (requires wireless upgrade kit. Compact: SeaTalk***NG***

ORDERING INFORMATION

E62247	G120 12" Marine Display	**E02047**	GPM400 Processor (Europe)
E62248	G150 15" Marine Display	**E02048**	GPM400 Processor (RoW)
E02036	G170 17" Marine Display	**E02043**	GVM400 Video Module
E02037	G190 19" Marine Display	**E02044**	Command Centre Keyboard (wired)
E62286	15" Glass Bridge Monitor	**E02045**	Command Centre Keyboard Base Station
E62287	17" Glass Bridge Monitor	**E02046**	Command Centre Keyboard Wireless Upgrade
E02042	GPM400 Processor (US)	**E62154**	Compact Keyboard

C SERIES WIDESCREEN MULTIFUNCTION DISPLAYS

C Series Widescreen redefines multifunction navigation with larger, more brilliant displays, increased performance, expanded networking and video integration. Take control with a commanding view of multiple sources of information. Choose full screen navigation or choose multiple widescreen window combinations of chart, radar, fishfinder, video – C Series Widescreen gives you the flexibility and luxury of screen space to create the ideal configuration for every navigation scenario.

C Series Widescreen displays are available in 9", 12" or 14" screen sizes.

PHOTO: SPIRIT YACHT © JOE MCCARTHY

Features

- Command view of multiple navigation sources on single widescreen display.
- Sunlight Viewable screen with Optical Bonding technology for improved viewing angle, colour and contrast in all lighting conditions.
- Super high resolution:
  C90W WVGA resolution 800 x 480 pixels.
  C120W WXGA resolution 1280 x 800 pixels.
  C140W WXGA resolution 1280 x 800 pixels.
- Internal high sensitivity GPS sensor.
- Preloaded with Navionics cartography.
- 3D and Satellite photo maps using optional Navionics Platinum charts.
- Intuitive UniControl™ pad streamlines activities and menu navigation.
- Dual display SeaTalk***HS*** networking.
- Composite video input for on board cameras or entertainment.
- Digital, HD Digital and Super HD Digital radar support.
- Dual range radar when used with HD or Super HD digital antennas.
- Connect to HD Digital Sounder Modules for digital fishfinding.
- SeaTalk, SeaTalk***NG***, NMEA 2000 and NMEA 0183 connectivity.
- Advanced SPX autopilot integration – activate the autopilot directly from the chartplotter.
- AIS target tracking in both chart and radar modes.

PHOTO: © JOE MCCARTHY

PHOTO: VIKSUND BÅT AS

Complete Navigation and Control

Create custom windows containing the data you want to see.

Intuitive

- The intuitive interface puts you in command. Simply 'page' through your choice of displays.
- Create custom windows of any combination of chartplotter, radar or sonar in your choice of layouts.
- Save your favourite trips – UniControl provides easy alphanumeric waypoint storage.
- Zoom x2, x3 or x4 and user-programmable zoom scales.

Single-station or dual display

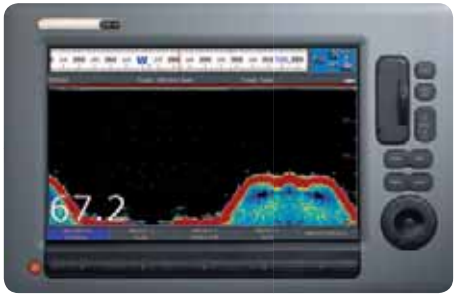
- Configure your C Series Widescreen display as a single function standalone chartplotter, digital fishfinder or radar or create a dual display widescreen network.
- Use the NMEA 2000 interface to display virtual instrument data from electronic engine instruments to trim tab systems.
- AIS and Navtex data input support.

Advanced Display Technology

- View your screen in all conditions.
- Direct sunlight viewable 16 million colour displays.
- Optical bonding technology for improved contrast, vibrant colour, wide viewing angle and the elimination of screen fogging.
- Prismatic light enhancing screens with integrated anti-glare filters.
- Night palette.

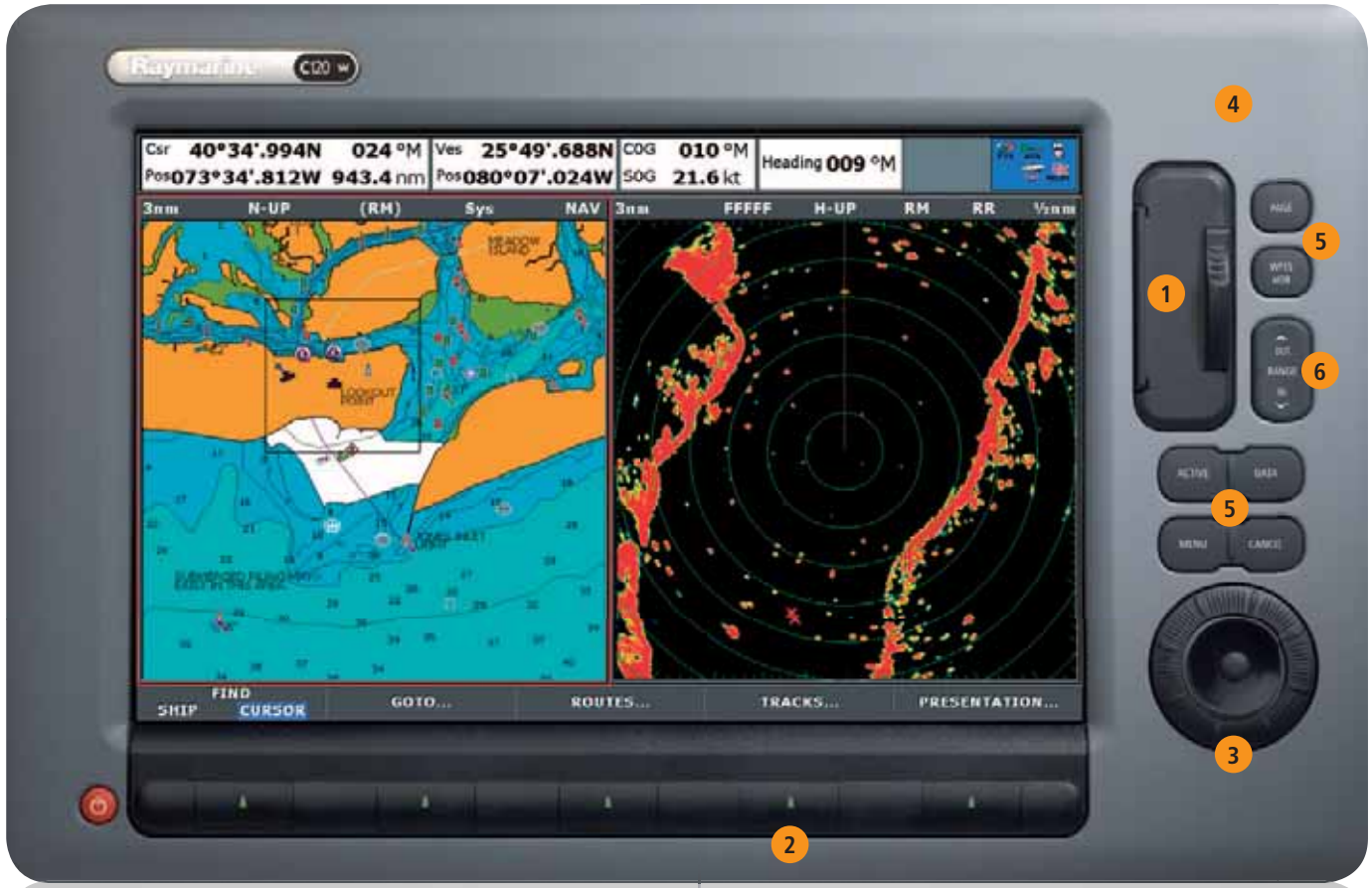
Full screen radar

Full screen chartplotter



Full screen fishfinder

User customisable split screens



SeaTalk Instruments and Autopilots | HD, Super HD and Digital Radar Antennas | SeaTalk[1] Keyboard | LifeTag Man Overboard System | DSC Communications Integration | Video Input (Composite Video) | HD Digital Fishfinder Module | SeaTalk[NG] Instruments and Pilots | Additional C Series Widescreen Display | Navtex and AIS

PHOTO: © JOE MCCARTHY

1. Chart Port. Install your Navionics Gold, Platinum or Platinum Plus charts stored on Compact Flash memory cards.

2. Soft Keys. Select corresponding functions identified by on-screen labels.

3. UniControl. Used to control on-screen cursor and scroll through menus.

4. GPS Sensor. Built-in high-sensitivity GPS sensor.

5. Dedicated Keys. 6 keys with dedicated functions.

6. Range Key. Used to zoom the screen in and out in chart, radar and fishfinder modes and scale the screen in and out for chart and fishfinder modes.

PHOTO: BENETEAU GROUP

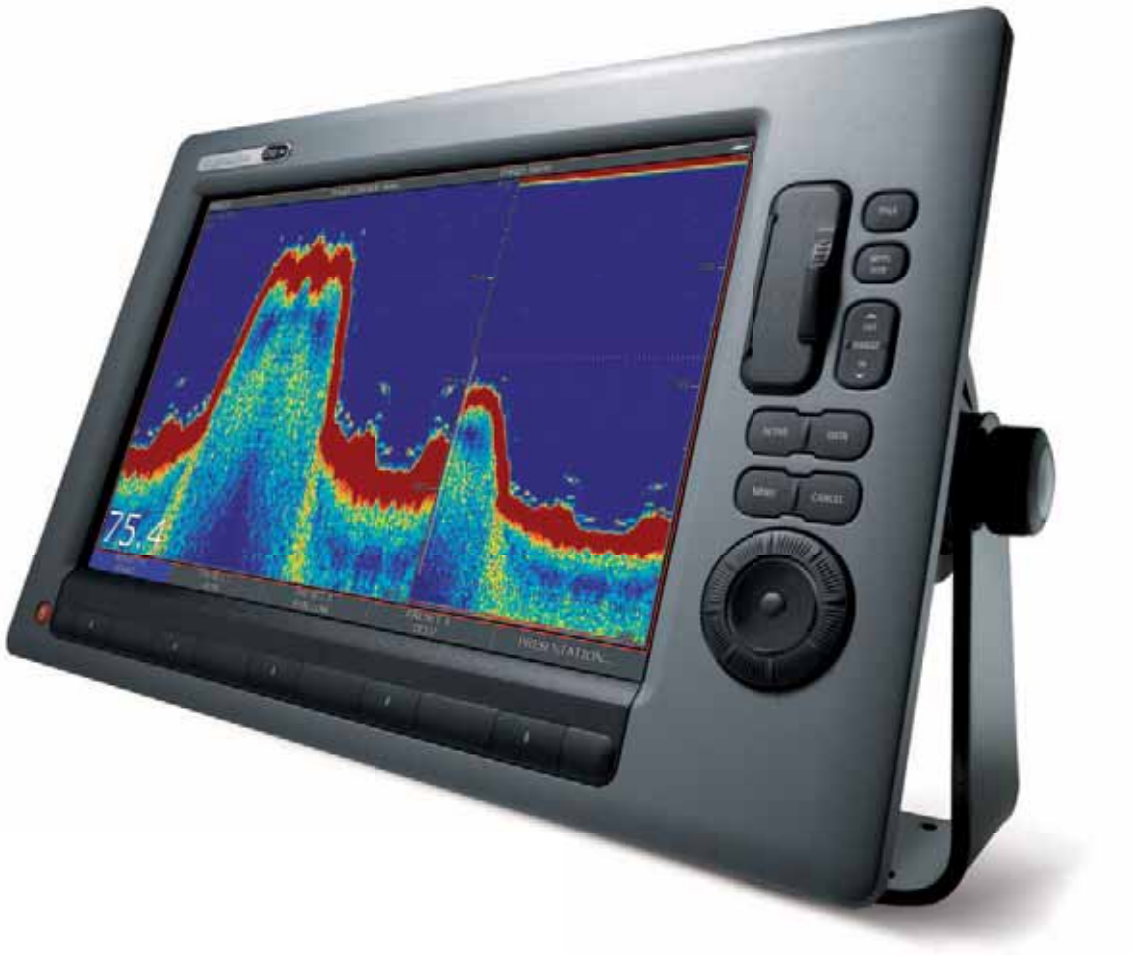
PHOTO: NORD WEST

PHOTO: NORTHSHORE YACHTS LTD

HD DIGITAL

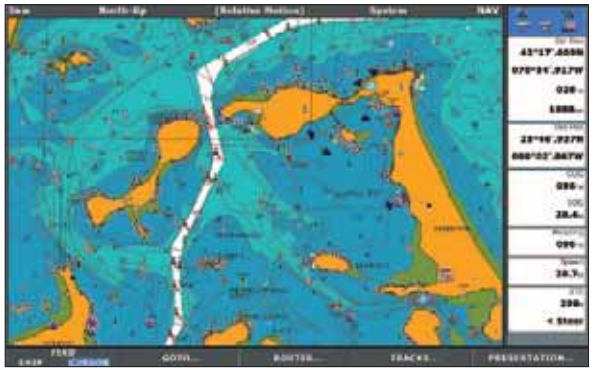
HD Digital Sounder Modules

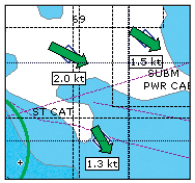
Experience Raymarine's patented HD Digital Fishfinder technology by adding a Digital Sonar Module to your C Series Widescreen network. Raymarine's HD Digital sounder technology delivers true hands-off operation thanks to an adaptive digital transmitter/receiver that automatically adjusts up to 220 sonar parameters per second. For more information on our range of HD Digital fishfinders, go to page 42 to 47.



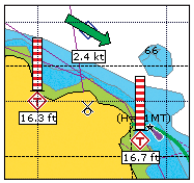
Digital and HD and Super HD Digital Radar Sensors
Expand the C Series Widescreen with Raymarine's unmatched digital radar technology. Go to pages 34 – 41 for further information.

HD DIGITAL





Current Graphics
Overlay current arrows on your charts.



Tide Graphics
Overlay tide indicators on your charts.

AIS Information
View AIS collision avoidance information when used with a compatible receiver.

Ready to Navigate with GPS and Charts
Each C Series Widescreen display is equipped with an internal high sensitivity GPS sensor. This high performance GPS sensor eliminates the need for an external GPS antenna for most installations. C Series Widescreen displays are also pre-loaded with high quality ready-to-navigate Navionics charts or step up to 3D or Satellite photo charts using optional Navionics Platinum charts on Compact Flash. An on board graphics co-processor provides quick chart screen redraws and stunning 3D graphics.

C Series Widescreen is compatible with the following Navionics charts on Compact Flash.

NAVIONICS Gold
NAVIONICS Gold+
NAVIONICS Platinum
NAVIONICS Platinum+

Smart Heading Sensor
For the best radar overlay and MARPA performance, choose the gyro enhanced Smart Heading Sensor.

Video Integration
Each C Series Widescreen display features a video input for an onboard camera. Raymarine Marine Cameras are plug-and-play and offer outstanding video quality and durability in the marine environment. Go to pages 52 to 53 for information.

Build your C Series Widescreen system

Build a system with single widescreen display or plug two C Series Widescreen displays together to create a dual display C Series Widescreen network – expand the system with SeaTalk***HS*** digital network sensors for radar and fishfinder.

Alternatively, a SeaTalk***HS*** 8 port network switch can be added for easy installation of all SeaTalk***HS*** sensors. C Series Widescreen displays also feature a SeaTalk***NG*** data bus (go to page 94) port for connecting to SeaTalk***NG*** compatible instruments, autopilots, and NMEA2000 compatible devices. The NMEA2000 interface enables any C Series Widescreen to display virtual instrument data from electronic engine instruments to trim tab systems. Two NMEA0183 in/out ports are available for AIS and third party devices. A first generation SeaTalk port is also available for networking with an external GPS sensor, LifeTag and first generation SeaTalk compatible instruments and autopilots.

SPX Autopilots

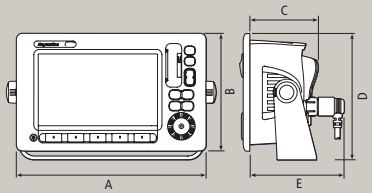
Using SeaTalk***NG*** C Series Widescreen and SPX autopilots go beyond conventional chartplotter-autopilot communication. C Series Widescreen displays can be used to control autopilot functions from the chartplotter interface. An autopilot dialogue enables the skipper to engage and disengage the autopilot directly from the C Series Widescreen display when using Raymarine's SPX pilots for waypoint and route navigation.

C SERIES WIDESCREEN SPECIFICATIONS

Nominal voltage	12V and 24V DC systems
Absolute voltage range	10.7 – 32V DC
Power consumption	C90: 19W; C120: 22W and C140: 32W (at full brightness)
Weight inc. bracket kg (lbs)	C90: 3.85 (8.5) C120: 4.76 (10.5) C140: 5.58 (12.3)
Display type	Colour LCD
Display resolution	C90: 800x480 pixels (WVGA) C120: 1280x800 pixels (WXGA) C140: 1280x800 pixels (WXGA)
Display size	C90: 229mm (9") C120: 307mm (12.1") C140: 358mm (14.1")
Display lighting	Sunshine visible / night mode
Connections	SeaTalk***HS*** (x2) SeaTalk (x1) SeaTalk***NG*** / NMEA 2000 (x1) Composite video input (PAL/NTSC) (1x) NMEA 0183 input (x3) NMEA 0183 output (x2) Alarm output (x1)

ORDERING INFORMATION

E62111-US	C90W multifunction display (US version)
E62111-EU	C90W multifunction display (European version)
E62111-RW	C90W multifunction display (Rest of World version)
E62113-US	C120W multifunction display (US version)
E62113-EU	C120W multifunction display (European version)
E62113-RW	C120W multifunction display (Rest of World version)
E62115-US	C140W multifunction display (US version)
E62115-EU	C140W multifunction display (European version)
E62115-RW	C140W multifunction display (Rest of World version)
A62132	C90W trunnion mounting kit
A62133	C120W trunnion mounting kit
A62134	C140W trunnion mounting kit



Dimensions (mm)
C90 A: 317 B: 197 C: 113 D:211 E: 136
C120 A: 380 B: 245 C: 113 D: 260 E: 136
C140 A: 424 B: 277 C: 113 D: 291 E: 136

A SERIES CHARTPLOTTERS AND CHARTPLOTTER-FISHFINDERS

Harness the power of Raymarine's advanced engineering and exclusive technologies with the A Series displays. Navigate like a pro using high resolution 2D or 3D and aerial photo charts and target fish with unprecedented clarity using Raymarine's unmatched HD Digital sonar technology.

PHOTO: © GLEN GALL

PHOTO: MALO YACHTS

- Built-in GPS antenna.
- Built-in Navionics cartography.
- Built-in HD Digital fishfinder module*.
- Built-in cable management system.
- Engine monitoring.

* A Series A50D, A57D and A70D module

PHOTO: BELLA-VENEET OY

PHOTO: X-YACHTS

Powerful Chartplotting

A Series chartplotters are available pre-loaded with Navionics charts that cover entire regions of Europe, US or the Rest of the World**. These charts offer familiar paper-like cartography that's clear and easy to read at all zoom levels, user selectable safety contours and object information.

For even greater chart detail and features, upgrade to the optional Navionics Gold or Platinum charts.

HD Digital™ Fishfinder

A Series chartplotter/fishfinders offer superior fish detection and bottom discrimination using Raymarine's HD Digital sonar technology. The HD Digital Fishfinder built into the A50D, A57D and A70D instantly adapts to changing seabed and water conditions for fully automatic hands-off operation.

AIS Target Tracking

Transform any A Series chartplotter into an AIS (Automatic Identification System) display using the optional AIS250 receiver or AIS500 transceiver.

Engine Monitoring

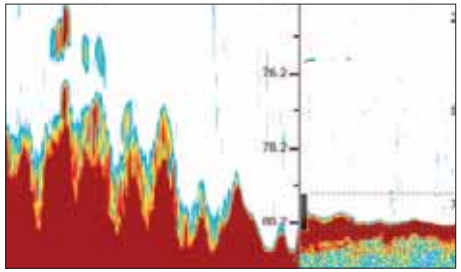
Connect with NMEA2000 compatible engine instruments and trim tabs using Raymarine SeaTalk*NG* next generation data bus.

** Pre-installed Navionics cartography excludes Greenland and Iceland, Finnish and Russian Lakes, EU and Russian inland waterways. Rest of the World cartography excludes the coast of China.

P58 transducer

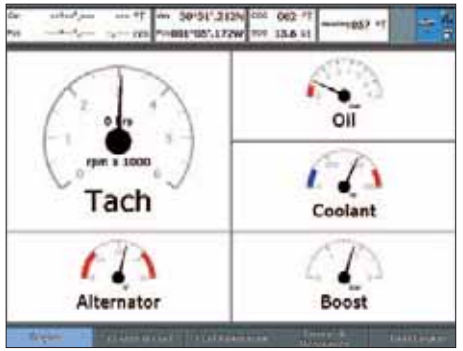
The A Series fishfinder version includes the plastic P58 depth, speed and temperature tri-ducer.

Powerful chartplotting



HD Digital Fishfinder

AIS target tracking

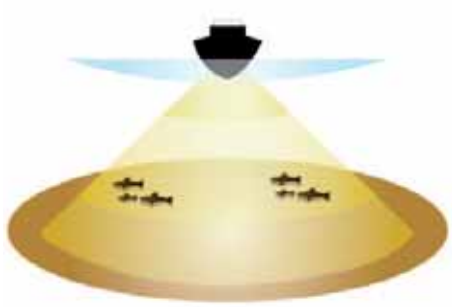


Engine monitoring

Cable Management

Cable management system keeps cables neat, tidy and out of sight. Quick release swivel mount bracket is easily fitted and allows rapid fit and removal of the A Series chartplotter for security purposes.

Beam rotated fore and aft



Beam rotated port and starboard

P48 Ultra wide fanbeam transducer option

Engineered for shallow water coastal, lake and river fishing, the unique FanBeam transducer delivers an extra wide view of the bottom. In addition to a very wide beam the Fanbeam can be rotated fore and aft or port and starboard with an easy-to-use rotary beam control built right into the top of the transducer housing. The FanBeam transducer is designed for transom or trolling motor mounting and features a built in temperature sensor.

Fanbeam features

- 3x the beam width of conventional 200 kHz transducers.
- Unique beam rotation control built into the transducer housing.
- 200 kHz frequency for fishing up to 300 feet of water.
- Elliptical wide beam is 38° x 12° degrees wide at -3dB (maximum measured power).
- The FanBeam transducer is available as an option for all A Series Chartplotter/Fishfinders.

PHOTO: GENMAR®

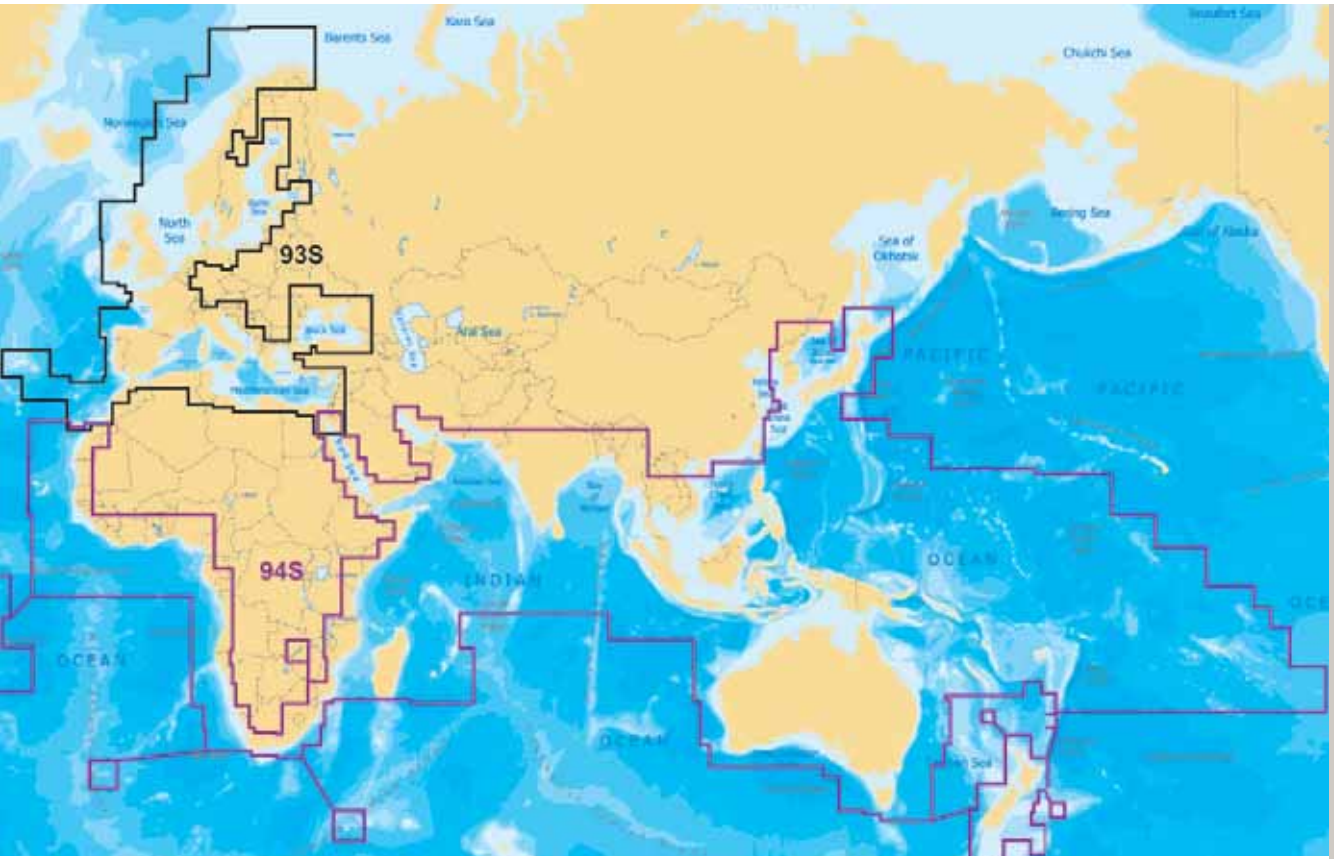


Chart coverage 93S: Embedded European Cartography 94S: Embedded Rest of World Cartography

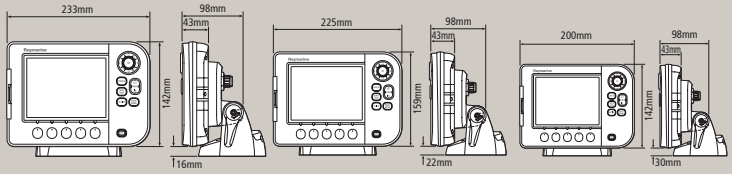
	A50	A50D	A57D	A70	A70D
A Series LCD Display Size – mm (in)	127 (5)	127 (5)	144 (5.7)	162 (6.4)	162 (6.4)
GPS / Chartplotter	•	•	•	•	•
HD Digital Fishfinder		•	•		•

SPECIFICATIONS

Power supply external	13.8V DC nominal floating earth / fully isolated
Power consumption	6–8W. 18W peak with sonar
Weight inc. bracket kg (lbs)	A50 / A50D 1.36 (3.0) A57D 1.46 (3.2) A70/A70D 1.50 (3.3)
Display type	Colour TFT LCD
Display resolution	640x480 pixels (VGA)
Display size	A50/A50D 127mm (5") A57D 144mm (5.7") A70/A70D 162mm (6.4")
Illumination	screen and keypad
Connections	NMEA 0183 input (x2) NMEA 0183 output (x2) Selectable to 4800 4800 Navtex; 9600 Navtex or 38,400 AIS; SeaTalk^{NG}; sonar / transducer (7-way connector); Compact Flash slot

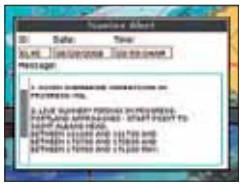
ORDERING INFORMATION

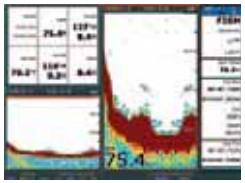
E62184-EU	A50 Chartplotter (European version)
E62184-RW	A50 Chartplotter (Rest of World version)
E62186-EU	A50D Chartplotter/fishfinder (European version)
E62186-RW	A50D Chartplotter/fishfinder (Rest of World version)
E62188-EU	A57D Chartplotter/fishfinder (European version)
E62188-RW	A57D Chartplotter/fishfinder (Rest of World version)
E62190-EU	A70 Chartplotter (European version)
E62190-RW	A70 Chartplotter (Rest of World version)
E62192-EU	A70D Chartplotter/fishfinder (European version)
E62192-RW	A70D Chartplotter/fishfinder (Rest of World version)
A62154	A Series flush mount kit
A102140	P48 Fanbeam transducer



C SERIES CLASSIC MULTIFUNCTION DISPLAYS

PHOTO: RIVIERA





Back to basics

Radar and chartplotting for leisure boats has advanced in leaps and bounds since Raymarine launched the first multifunction displays over six years ago. Look at the functions and features for the new E Series HybridTouch (page 16 to 21) to see the difference a few years can make. However, if your desire is a simple radar and chartplotter system that is robust and reliable, the C Series Classic has just what you need.

C Series Classic displays are capable of showing radar, chart and fishfinder information on a single sunlight viewable screen. View information full screen or in custom windows with multiple sources of vital information visible simultaneously.

2kW Radome radar antenna

C Series Classic is easy to use with its on screen menus and dedicated function keys. Additional 'Twist 'n' Click', range and track pad controls make zooming, chart panning, waypoint naming, scrolling menus and feature selection quick and easy to accomplish.

Features

- Navtex weather data input and AIS data input support.
- Engine monitoring support for NMEA 2000 and J1939 compatible engines (view graphical trim tab, engine tilt, generator data and trip average fuel rate).
- Customisable instrument and data screens, including compass rose and sea temperature graph.
- Plan your journey at home with RayTech software (see page 60) and then transfer your plan to C Series using a Compact Flash memory card.
- See tide and currents with dynamic tide and current overlays and animation.
- View the intuitive compass bar display across the top of your screen.
- Display range rings on your chart to see how far objects are from your vessel.
- Full support for Navionics Gold and Gold Plus cartography on Compact Flash.
- Distances less than 1/4 nm displayed in metres or feet, depending on unit selection.
- Additional system integration when used with a Raymarine autopilot... engage pilot directly from your C Series Classic display.

Note: Engine monitoring enhancements require connection to NMEA 2000-compatible components.

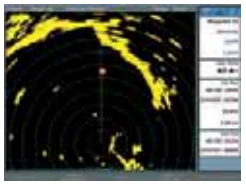
Chartplotting

Connect the optional Raystar125 SDGPS Sensor and add Navionics Gold charts to transform the C Series Classic display into an accurate and detailed GPS charting system.

- 256 colour high-resolution display.
- True and relative motion modes.
- Auto range mode intelligently maintains your vessel and your waypoint on the best chart scale while underway.
- Quick and easy alphanumeric waypoint storage using the 'Twist 'n' Click' rotary control.
- On-screen VHF DSC position reports (with compatible DSC VHF via NMEA).
- Unlimited waypoint, route and track storage using Compact Flash cards.

Choose between the C120 12.1" or C80 8.4" system

PHOTO: JEANNEAU (BENETEAU GROUP)



Radar

Add an optional non-digital radar scanner to create a powerful radar system.

- Overlay radar information onto the chart screen with the radar/ chart overlay feature.
- MARPA (Mini-Automatic-Radar-Plotting-Aid) target tracking (requires smart heading sensor) or gyro pilot.
- Waypoint navigation and multiple waypoint overlay.
- Low receiver noise figure (< 5dB).
- Auto GST™ fully automatic gain, sea clutter and tune control for real 'hands-off' operation.
- Advanced microprocessor controlled transmitter-receiver features 8 pulse width/PRF settings, providing enhanced target returns through every range scale.

Raystar 125 GPS antenna

PHOTO: NAJADVARVET AB

PHOTO: SESSA MARINE

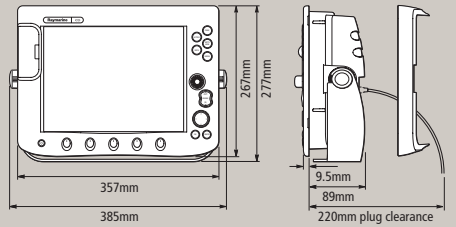
C SERIES CLASSIC SPECIFICATIONS

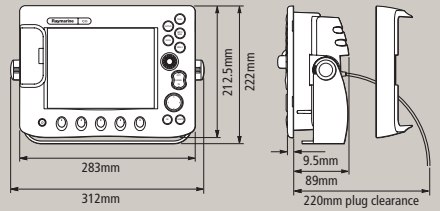
Power supply	12V and 24V systems
Absolute voltage range	10.7 – 32V DC
Power consumption (Watts)	C80: 10W at full brightness C120: 12W at full brightness
Display sizes	C80: 8.4" / C120: 12.1"
Display lighting	64 levels with day/night mode
Weight kg (lbs)	C80: 1.8 (3.9) / C120: 3 (6.6)
Mounting method	flush or bracket
Display resolution (pixels)	C80: 640x480 C120: 800x600
Connections	SeaTalk / SeaTalk² / NMEA2000 Radar input Digital sounder input (hsb²) 1x NMEA 0183 input 1x NMEA 0183 output

ORDERING INFORMATION

E02020	C80 8.4" C Series Classic Display
E02022	C120 12.1" C Series Classic Display
E52079	RD218 18" 2kW Radome

For RayStar125 GPS and RD218 2kW Radome specifications, please go to our website for information.





RAYMARINE MARINE RADARS DELIVER UNMATCHED PERFORMANCE AND EASE-OF-USE.

Why radar?
Where am I in relation to my surroundings? Is there anything near me that could be a danger to me, or vice versa?

Radar is a great aid to navigation that enables you to;

- 'See' other vessels, buoyage and coastline in reduced/negligible visibility
- Track targets – not everything transmits AIS…
- Double check your relative position and speed
- Avoid hazards and obstacles
- Track weather
- Find fish!

Each Raymarine marine radar system consists of a Raymarine multifunction display (excluding A Series displays), and your choice of Raymarine radome or open array antenna.

Hardware – Radome or Open Array?

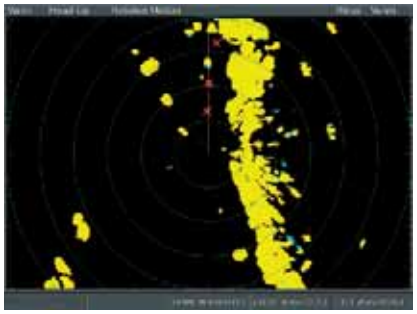
Radomes
Digital or HD Digital Radomes are ideal when power is at a premium and mounting space is limited or restricted by rigging. Perfect for sailboats, RIBs and smaller powerboats, radomes provide exceptional performance even in the most challenging conditions – new HD Digital Radomes for additional features and improved resolution.

Open Arrays
Choose an HD Digital or Super HD Digital open array scanner for enhanced performance and range. These larger scanners, equipped with a more efficient antenna (increased gain) and narrow beam widths, deliver substantial improvements in range and bearing resolution giving great performance and clear target separation.

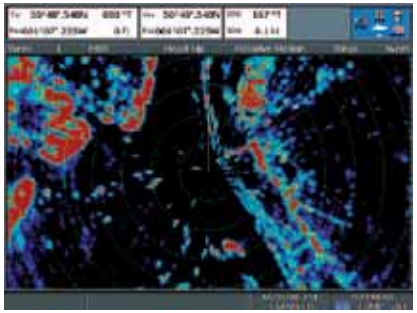
Technology and Software – what's the difference?
Raymarine has 4 different types of radar antenna; **Analogue, Digital, HD Digital and SHD Digital.**

Analogue (or traditional) **radar** is still available from Raymarine in a basic robust system using a 2kW radome* and a C Series Classic display. Analogue uses a one colour display and can produce chart overlay. Go to page 32 for details.

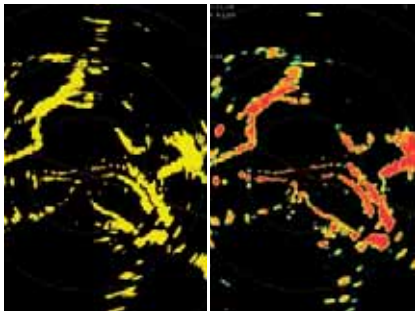
*Not compatible with G Series, C Series Widescreen or E Series Widescreen.



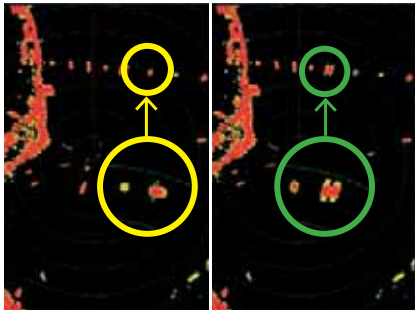
Digital radar image.



HD Digital radar image.



Digital vs HD Digital radar.



HD Digital vs Super HD Digital radar.

Digital radar

Offers 4kW capability for improved performance and uses digital processing for increased target definition. Digital reduces the cable size (compared to analogue) and makes an easier interface to larger systems. Lower power consumption and costs less than a full HD Digital system.

HD Digital™ radar

Raymarine's HD Digital technology's powerful digital signal processing distinguishes between target types, detects weak and distant contacts automatically, while virtually eliminating clutter and noise. The truly adaptive transmitter and receiver automatically adjusts to changing environmental and sea conditions. HD Digital radar delivers a dramatically clearer radar picture with crisp, well-defined contact echoes and a life-like target presentation.

Super HD Digital™ Radar

SHD Digital radar is a giant leap in leisure marine radar. Using highly advanced digital signal processing, Super HD Digital radar has much greater dynamic range than conventional radar enabling the digital receiver to acquire and process vast amounts of echo information that is normally lost by conventional analogue radar systems. Super HD Digital technology intelligently isolates and identifies true radar targets, while simultaneously eliminating unwanted clutter. The extra-narrow beam width pinpoints targets with stunning clarity. The result is a dramatically clearer radar display.

Image Comparison

Digital vs HD Digital

HD Digital targets are clearly defined compared to the standard Digital image.

HD Digital compared to Super HD Digital

Super HD reveals even more detail than HD Digital. The Super HD image shows that there are actually two targets in the ringed area, whereas the same targets on the HD image appear as one.

Super HD Digital vs. commercial 25kW radar comparison
Target separation on longer range scales (6nm) is greatly improved. Super HD Digital processing detects and separates targets undetected by the larger commercial-grade radar.

25kW 8.5' commercial radar merges targets.

Super HD Digital radar clearly shows liner, tug and spectator sailing vessel.

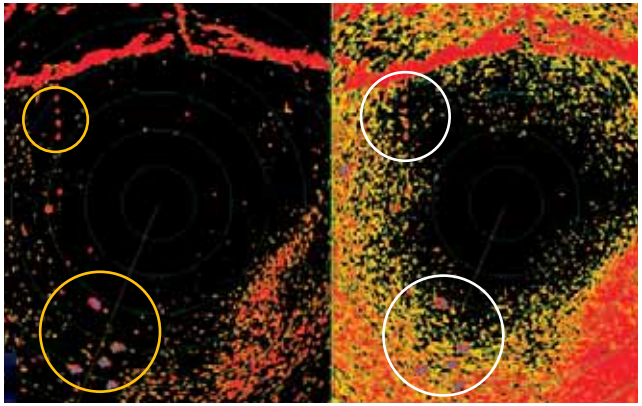
What's new in Raymarine radar for 2010?

NEW bird mode* to help fishermen detect fish shoals by tracking sea bird movements.
NEW high speed radar scanning* (automatic 48rpm mode) for optimal tracking of fast moving targets at short ranges.
HD Digital technology now available in **radome format**.

*With HD Digital dome and SHD open array only

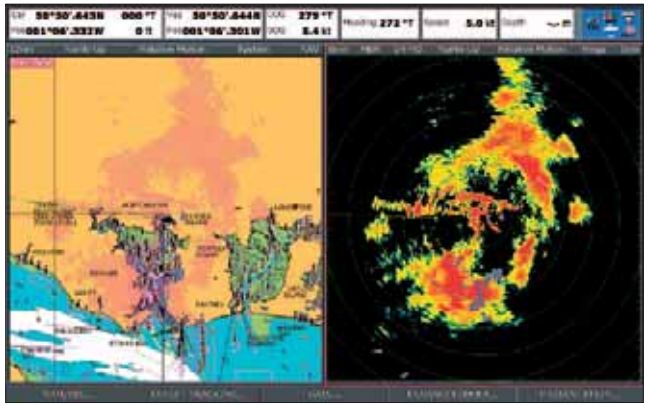
PHOTO: NORD WEST

Weather advantage
Raymarine's HD Digital scanners provide superior all weather performance allowing you to still see targets through rain and thunderstorms. Use radar to track weather too.



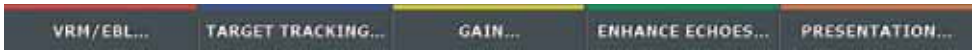
During this abnormally heavy rain storm (see right hand image), rain mode was used to cut the clutter to clearly reveal the targets (see left hand image).

Cut the clutter
Detect targets at very close proximity to your vessel, or at very long ranges to see distant vessels, land features and even weather fronts. Distinguish targets through even the heaviest rain clutter.



See the weather coming and overlay on to corresponding chart.

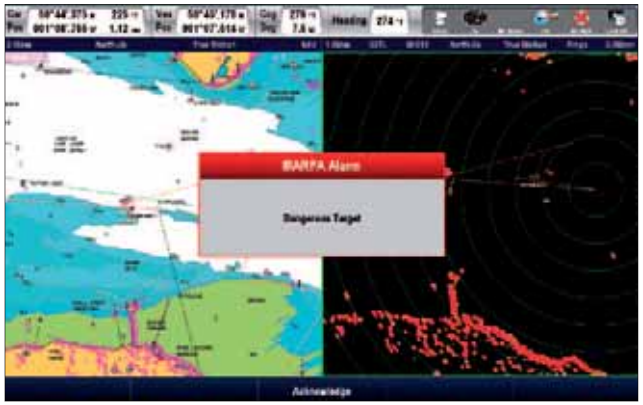
An array of advanced operating modes are available via on-screen menus and soft-key functionality.



Track targets

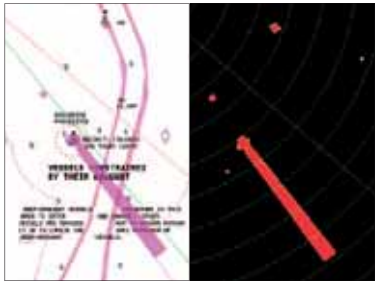
Not everything transmits AIS! Using MARPA* (mini-automatic radar plotting aid) allows you to identify vessel, speed, bearing, closest point of approach (CPA) and time to closest point of approach (TCPA), dangerous/proximity alarms, overlay AIS info for further target clarification.

Target (1) has been acquired (red circle overlay) using MARPA and is being tracked by your radar. Speed and bearing of the target are shown and the target's heading is shown as a thin red line at 65°.



The tracked target has now moved into the previously set guard zone around your vessel and has triggered the dangerous target alarm, seen on screen, and set off an audible alarm.

The alarm has been acknowledged and the target's (1) (now overlaid with a red triangle to note possible danger) closest point of approach (CPA) to your vessel is shown on screen as 0.376nm (3) and time to closest point of approach (TCPA) is 4 mins 20 secs (2).



Racon and SART

Raymarine radar antennas also trigger RACON beacons – great for absolute confirmation of position in poor visibility. Raymarine radar antennas are also able to pick up and home in on signals from Search And Rescue Transponders.

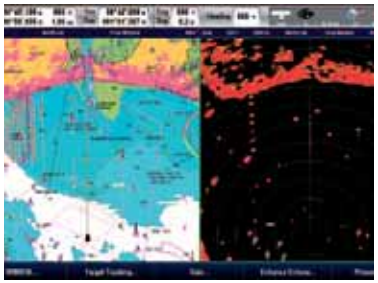


Chart Overlay

Radar can be overlaid onto a chart, as shown in the left hand image, to clearly identify targets. Note the superior target clarity and separation on the submarine barrier to the left of both screens.

Important Information

Safe emissions

Powerful enough to slice through atmospheric clutter, Raymarine radars still comfortably meet International limits for energy absorption – in fact, the energy absorbed from an ordinary mobile phone can be several times greater than that from a correctly installed Raymarine radar.

Installation

All radars work on line-of-sight principles so although antennas could theoretically be fitted almost anywhere, unobstructed and parallel to the water line is better.

Interference resistance

Raymarine radars use interference rejection technology to resist signal interference from other vessels' transmissions.

Pulsed magnetron vs broadband radar technology

Broadband radars typically emit low levels of energy, resulting in loss of ultimate performance in conditions of fog, rain, spray and snow, and limiting target detection at longer ranges.

Raymarine pulsed magnetron radars combine low average energy with high peak powers allowing the radar to detect targets at greater ranges, and to punch through adverse weather conditions ensuring targets are identified.

* For the best radar overlay and MARPA performance fit a smart heading sensor or an SPX autopilot.

	RADAR – MULTIFUNCTION DISPLAY COMPATIBILITY				
	C SERIES CLASSIC	**C SERIES WIDESCREEN**	**E SERIES CLASSIC**	**E SERIES WIDESCREEN**	**G SERIES**
Analogue radar	●		●		
Digital radar		●	●	●	●
HD Digital and Super HD Digital		●	●	●	●
Dual range		With HD/SHD radar only	With HD/SHD radar only	With HD/SHD radar only	With HD/SHD radar only
Bird mode and high speed radar scanning (48rpm)		With HD Digital dome and SHD open array only		With HD Digital dome and SHD open array only	With HD Digital dome and SHD open array only
Dual radar antenna installation			Only one at a time, one or the other	Only one at a time, one or the other	Can access both radars at the same time

PHOTO: SUNSEEKER INTERNATIONAL

RADOME AND OPEN ARRAY FEATURES COMPARISON

		Peak power output (kW)	Maximum range scale	Rotation rate	Signal processing	Horizontal beam width -3dB	Vertical beam width -3dB	Near and far dual range mode	Bird mode	Pulse length / PRF (auto target / expand)	Weight kg	Automatic harbour, coastal offshore and buoy modes	256 multi-level colour and selectable colour palettes	SeaTalk^{hs} networking	C Series Classic compatible	C Series Widescreen compatible	E Series compatible	E Series Widescreen compatible	G Series compatible
	**18"** RD418	2	48	24	Analogue	4.9°	25°			8	9				●		●		
	18" RD418D	4	48	24	Digital	4.9°	25°			8	9.5	●		●		●	●	●	●
	24" RD424D	4	48	24	Digital	3.9°	25°			8	10	●		●		●	●	●	●
	18" RD418HD	4	48	24/48	HD Digital	4.9°	25°	●	●	8	9.5	●	●	●		●	●**	●	●
	24" RD424HD	4	48	24/48	HD Digital	3.9°	25°	●	●	8	10	●	●	●		●	●**	●	●
	**48"** RA1048D	4	72	24	HD Digital	1.9°	25°	●		8	25.6	●	●	●		●	●	●	●
	48" RA1048SHD	4	72	24/48	Super HD	<1°*	25°	●	●	8	25.6	●	●	●		●	●	●	●
	48" RA3048HD	12	72	24	HD Digital	1.9°	25°	●		8	25.6	●	●	●		●	●	●	●
	48" RA3048SHD	12	72	24/48	Super HD	<1°*	25°	●	●	8	25.6	●	●	●		●	●	●	●
	**72"** RA1072D	4	72	24	HD Digital	1.15°	25°	●		8	29	●	●	●		●	●	●	●
	72" RA1072SHD	4	72	24/48	Super HD	<1°*	25°	●	●	8	29	●	●	●		●	●	●	●
	72" RA3072HD	12	72	24	HD Digital	1.15°	25°	●		8	29	●	●	●		●	●	●	●
	72" RA3072SHD	12	72	24/48	Super HD	<1°*	25°	●	●	8	29	●	●	●		●	●	●	●

* Horizontal beam width on Super HD open arrays adjustable to less than 1°. ** Not full functionality.

PHOTO: © JOE MCCARTHY

0.5nm range rings showing 4.25nm to harbour

Clear return from submarine barrier

Clear return from small fishing vessel

Clear return from small fishing vessel

Heading and bearing

Vessel

Clear return from cardinal mark

AIS transmitting vessels at anchor

Just a few examples of the elements that you might see with your Raymarine radar.

Corresponding fishing vessel return

Corresponding cardinal mark

Corresponding vessel, heading and bearing

Corresponding return from submarine barrier

Corresponding AIS transmitting vessels at anchor

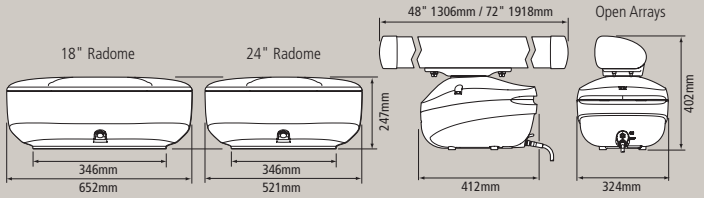
PHOTO: NORTHSHORE YACHTS LTD

RADAR SPECIFICATIONS

System Voltage	12 / 24V Systems		
Voltage range	10.8 – 32 V DC		
Power consumption	**Typical**	**Standby**	**Sleep**
Digital Radome (@ 24V):	40W (@ 24rpm)	25W	1.2W@24V
HD Digital Radome (@ 24V):	45W (@ 48rpm)	25W	1.2W@24V
Open Array 4kW (@ 24V):	70W (@ 48rpm)	30W	1.2W@24V
Open Array 12kW (@ 24V):	100W (@ 48rpm)	30W	1.2W@24V
Power consumption (standby)	Open Arrays: 9.2W; Radomes: 20W		
Transmitter frequency	12kW products 9420 ± 20 MHz All other products 9405 ± 20 MHz		
Temperature range	-10°C to +55°C operating -20°C to +70°C non operating		
Humidity	up to 95%		
Waterproofing standard	IPX6		

ORDERING INFORMATION

E92130	RD418D 4kW 18" Digital Radome (for cables go to page 95)
E92132	RD424D 4kW 24" Digital Radome (for cables go to page 95)
E92142	RD418HD 4kW 18" HD Digital Radome (for cables go to page 95)
E92143	RD424HD 4kW 24" HD Digital Radome (for cables go to page 95)
T52071	RA1048D 4kW 48" HD Digital Open Array (15m cable)
T52074	RA1072D 4kW 72" HD Digital Open Array (15m cable)
T52085	RA1048SHD 4kW 48" Super HD Digital Open Array (15m cable)
T52087	RA1072SHD 4kW 72" Super HD Digital Open Array (15m cable)
T92168	RA3048HD 12kW 48" HD Digital Open Array (15m cable)
T92169	RA3072HD 12kW 72" HD Digital Open Array (15m cable)
T52086	RA3048SHD 12kW 48" Super HD Digital Open Array (15m cable)
T52088	RA3072SHD 12kW 72" Super HD Digital Open Array (15m cable)
E52069	4kW Pedestal HD Digital (includes VCM100)
E52081	12kW Pedestal Super HD Digital (includes VCM100)
E92160	12kW Pedestal HD Digital (includes VCM100)
E52082	12kW Pedestal Super HD (includes VCM100)
E52083	48" Open Array HD Digital
E52084	72" Open Array HD Digital
E52092	48" Open Array Super HD Digital
E52093	72" Open Array Super HD Digital



HD DIGITAL FISH IMAGING – SEE THE DIFFERENCE

Raymarine Digital Sounder Modules bring the benefits of Raymarine's award winning HD Digital fish finding technology to the C Series Classic, C Series Widescreen, E Series Widescreen, E Series Classic and G Series Multifunction Navigation Systems.

- HD Digital technology eliminates surface clutter and water column noise, revealing more fish.
- HD Digital processing delivers the most life-like bottom structure presentation without the need for manual tuning or adjustments. The operation is truly "hands-off."
- Raymarine's HD Digital processing marks individual bait fish and game fish, even when tightly packed together, or stacked vertically.
- HD Digital visually separates bottom dwelling fish from the ocean bed/floor.

Fishfinder features

- Raymarine's patented HD Digital fishfinder technology using a remotely mounted Digital Sounder Module.
- Hands-free HD Digital technology automatically adjusts more than 220 sonar parameters per second and virtually eliminates clutter.
- HD Digital adaptive receiver technology precisely targets fish and bottom structure with amazing clarity.
- Bottom lock, A-Scope and Zoom modes.
- Auto adaptive control of sensitivity, ping rate and transmit power.
- Four fishfinder presets for one touch access to your favourite views of split screen, frequency, zoom, bottom lock and more.
- Bottom structure and target detail are delivered in native resolutions up to 1280 x 1024 pixels.
- Fully automatic "hands off" operation for a dramatically clearer picture.
- Full range of high and ultra high performance transducers available.

Target Fish

Thanks to HD Digital technology, anglers can easily identify individual species of fish and their habitat at a glance. The adaptive digital receiver of the digital sounder module enables anglers to easily distinguish bait fish from larger species.

DSM30/300 Dual or DSM400 multiple frequency

For top performance in both shallow and deep water, powerful dual or multiple frequencies conveniently allow you to choose your frequency manually or use the auto frequency function. You can choose to display one frequency in easy-to-read full screen mode or view up to 4 multiple frequencies (dependent on transducer setup) simultaneously in split screen mode.

A Scope and bottom coverage

See fish and the seabed in real time – A-scope technology instantaneously displays the echoes found in the transducer's acoustic beam. Using the patented bottom coverage feature, you can easily see the size of the area of seabed being covered by the transducer cone.

Bottom lock

Bottom lock has the unique ability to smooth out the seabed presentation and is extremely useful if you are looking for fish that live close to the ocean floor. It gives greater magnification of fish echo returns directly above the seabed, helping you differentiate structure from fish.

Zoom

Use the auto zoom to help you find fish and their habitat close to the bottom, or select manual zoom for a detailed view of fish closer to the surface. Pinpoint fish echoes with x2, x3 and x4 zoom magnification.

PHOTO: HAINES GROUP

PHOTO: NB MARINE

HD DIGITAL

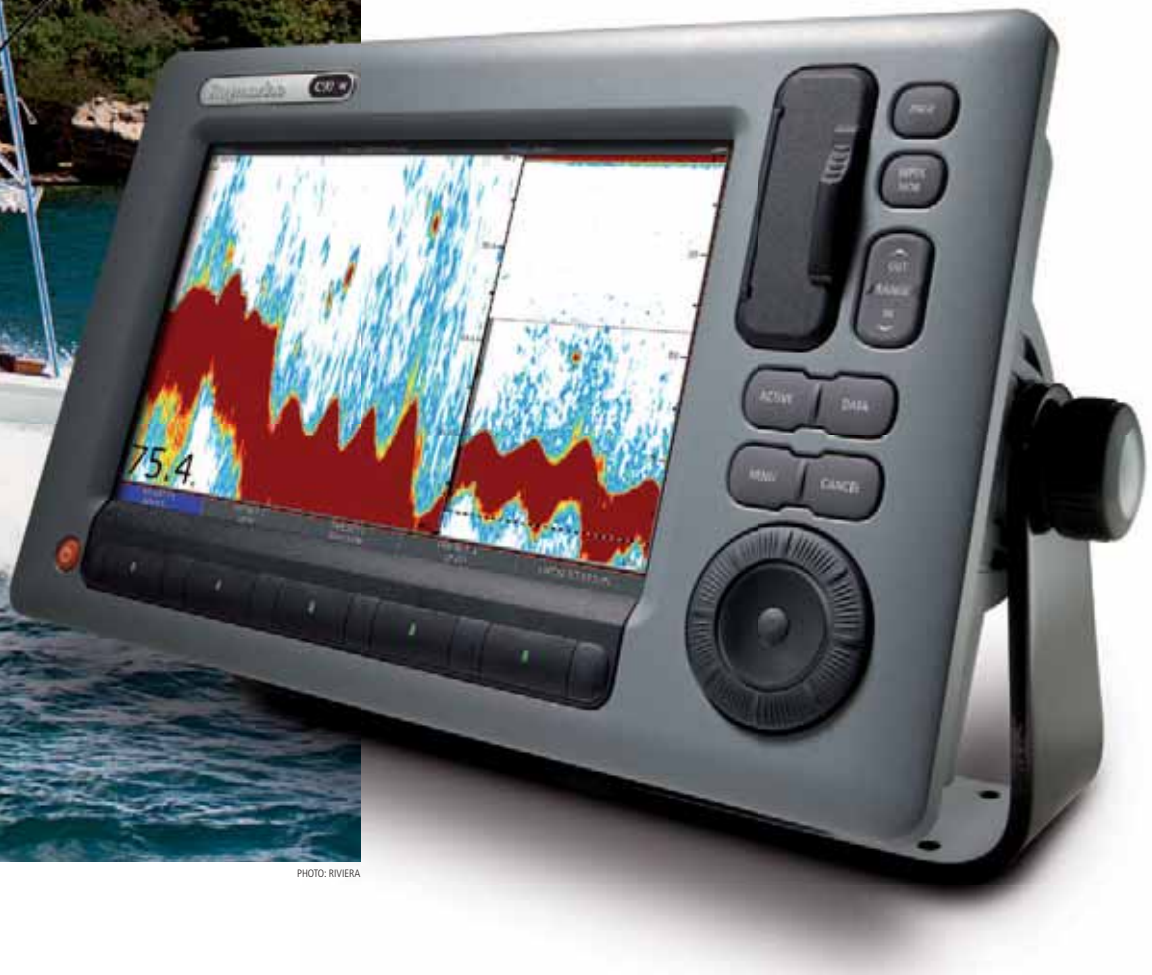
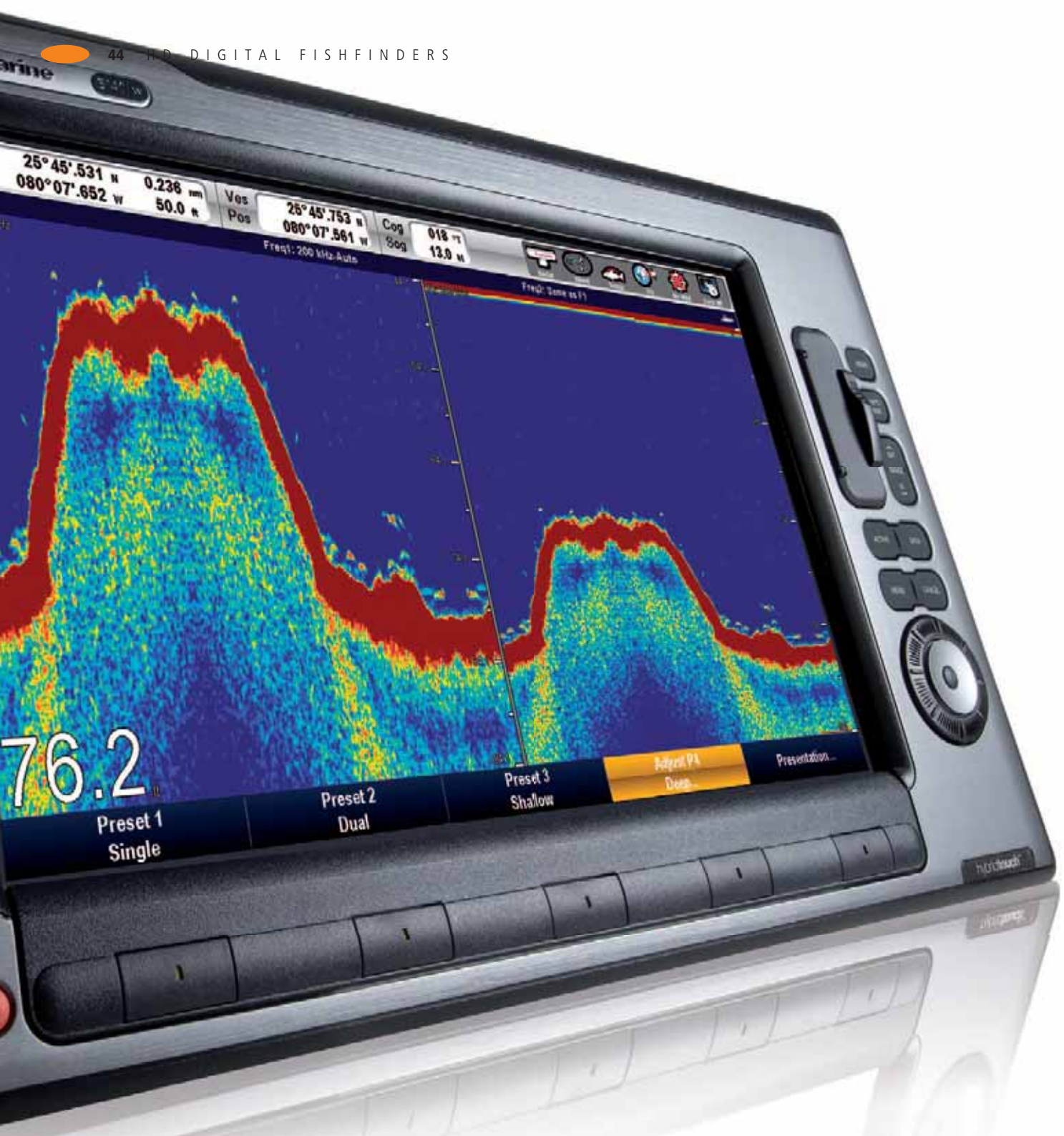
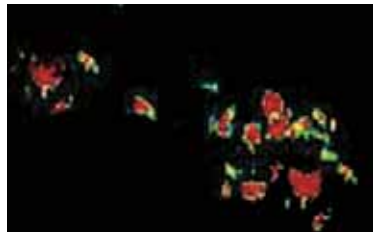


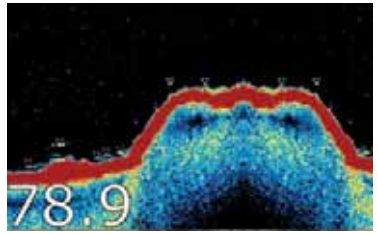
PHOTO: RIVIERA



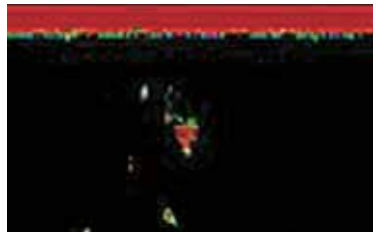
Individual targets
Targets are identified individually so you can pick out big fish from bait fish.



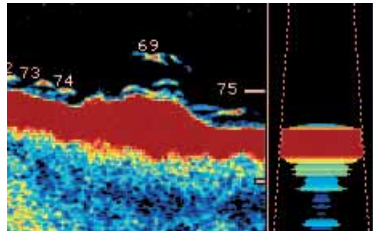
View the sea bed
HD Digital enables you to view the sea bed clearly and in great detail.



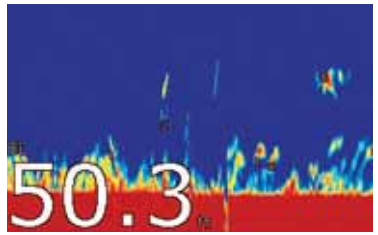
Eliminate Clutter
HD Digital eliminates surface clutter for superior performance.



A Scope
See fish echoes and bottom returns in real time with the A Scope feature.



Zoom
x2, x4 or x6 zoom for enlarged view of targets.



DSM30 HD Digital fishfinder module

The DSM30 is the ideal choice for the coastal and inland fishermen. The DSM30 Digital Sounder Module adds HD Digital technology to Raymarine C Series Classic, C Series Widescreen, E Series Classic, E Series Widescreen and G Series multifunction displays. DSM30 features patented Raymarine HD Digital sounder technology, dual frequency (50/200kHZ) and 600 Watts of output power.

DSM300 HD Digital fishfinder module

The DSM300 is the perfect choice for offshore anglers. Boasting up to 1kW of output power (depending on choice of transducer) the DSM300 Digital Sounder Module adds HD Digital technology to Raymarine C Series Classic, C Series Widescreen, E Series Classic, E Series Widescreen and G Series multifunction displays. DSM300 features patented Raymarine HD Digital sounder technology and dual frequency (50/200kHZ) operation.

DSM400 HD Digital fishfinder module

The DSM400 delivers the power and performance serious offshore fishermen demand. Operating at 1, 2 or 3 kW transmitting power, the DSM400 takes Raymarine's patented HD Digital technology to a whole new level. The DSM400 supports dual depth transducers and 28, 38, 50, 185 and 200 khz frequencies. This premium digital sounder module is compatible with E Series Classic and G Series. It will be compatible with C Series Widescreen and E Series Widescreen in 2010.

HD DIGITAL

A Series units have HD Digital fishfinder modules and GPS sensors built in to the displays.

Combine the Digital Sounder Module with a multifunction display to create an 'all-in-one' integrated fishfinder/ radar/chartplotter display.

The Digital Sounder Module adds HD Digital echo sounder technology to every display in the navi-gation network.

The Digital Sounder Module adds HD Digital echo sounder technology to every display in the navi-gation network.

	HD DIGITAL FISHFINDERS			
FEATURES	**A SERIES**	**DSM30**	**DSM300**	**DSM400**
Power output (power dependent on transducer used)	500 Watts	600 Watts	600 or 1000 Watts	1, 2, or 3kW
Dual frequency 200/50kHz operation	●	●	●	
Multiple operation frequencies – 28, 38, 50, 185 and 200kHz				●
4 independent transceivers allowing 2 dual frequency transducers to see 4 different sonar images (2 at a time)				●
Operating voltage	12V	12V	12 or 24V	12 or 24V
Infinite number of automatic receiver bandwidths for adapting to all types of sea and bottom conditions		●	●	●
HD Digital receiver technology provides Auto Adaptive control of Sensitivity, Ping rate and Transmit Power		●	●	●
Compatible with ultra high-performance transducers, including broad bandwidth and widebeam				●
Compatible with C Series Classic multifunction single station displays		●	●	
Compatible with C Series Widescreen multifunction network displays		●	●	●
Compatible with E Series Classic multifunction network displays		●	●	●
Compatible with E Series Widescreen multifunction network displays		●	●	●
Compatible with G Series premier navigation system		●	●	●

Transducers

Installing the right transducer is vital to getting the most out of your digital sounder module. Raymarine offers a range of transducers designed for a variety of vessel types and performance requirements. For more information on choosing a transducer please visit www.raymarine.com or talk to your local authorised Raymarine dealer.

P66 | P79 | B60/B164 | SS555 | R99 | R199/M260 | B260/B258/B744V/B744VL | SS270 Wide/B260/B258/B744V/B744VL

PART NO.	MODEL	MATERIAL	FEATURES			PERFORMANCE	MAX POWER	APPLICATIONS		
			DEPTH	SPEED	TEMP			OB POWER	IB POWER	SAIL
Transom Mount Transducers										
E66054	P66	Plastic	•	•	•	Good	600w	•		
E66019	ST69	Plastic		•	•	–	–	•		
In-Hull Transducers										
E66008	P79	Plastic	•			Good	600w	•	•	•
A66089	M260	Plastic	•			Best	1000w	•	•	•
E66076	R199	Plastic	•			Ultimate	2000w	•	•	•
Through-hull Transducers										
A66091	B744V	Bronze	•	•	•	Good	600w	•	•	
A66092	B744VL	Bronze	•	•	•	Good	600w	•	•	
E66013	P319	Plastic	•			Good	600w	•	•	•
E66014	B117	Bronze	•			Good	600w	•	•	•
E66015	SS555	Stainless	•			Good	600w	•	•	•
E66082	B258	Bronze	•		•	Better	1000w	•	•	
A102121	SS270 Wide Beam	Stainless	•		•	Best	1000w	•	•	•
E66079	B260	Bronze	•		•	Best	1000w	•	•	
E66075	R99	Plastic	•		•	Ultimate	2000w	•	•	
E66071	P120-ST800	Plastic		•	•	–	–	•	•	•
E66072	B120-ST800	Bronze		•	•	–	–	•	•	•
Tilted Element Through-Hull Transducers										
E66085	B60-20°	Bronze	•		•	Good	600w	•	•	•
E66086	B60-12°	Bronze	•		•	Good	600w	•	•	•
A102137	B164-0°	Bronze	•		•	Better	1000w	•	•	•
A102112	B164-12°	Bronze	•		•	Better	1000w	•	•	•
A102113	B164-20°	Bronze	•		•	Better	1000w	•	•	•

PHOTO: © JOE MCCARTHY

PHOTO: HAINES GROUP

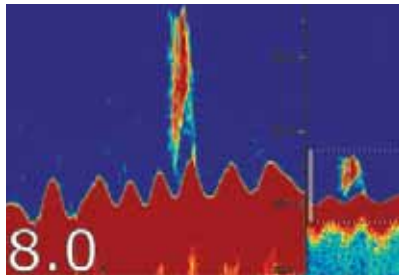
PHOTO: TIARA

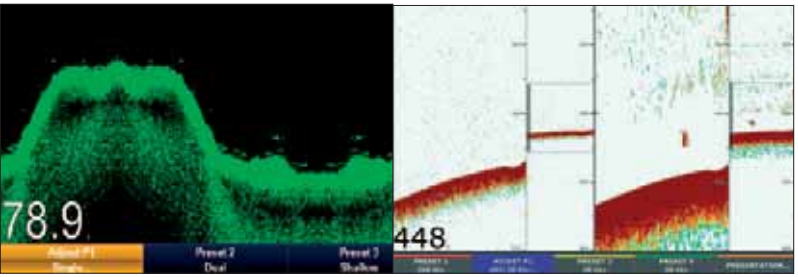
High performance transducers

For maximum performance a wide range of professional grade transducers are available for the DSM400. Choose multiple external mount or high performance in-hull transducers. In-hull transducers help eliminate cavitation and turbulence for improved performance at high speeds. Optional ultrasonic speed and high precision water temperature sensors are also available.

R299/R399 | R209/R309 | CS4500

PART NO.	MODEL	MATERIAL	FEATURES			FREQUENCY (KHz)	MAX POWER	APPLICATIONS		
			DEPTH	SPEED	TEMP			OB POWER	IB POWER	SAIL
In-Hull Transducers										
A102115	R299	Plastic	•			38/50/185/200	3000w	•	•	•
A102117	R399	Plastic	•			28/38/185/200	3000w	•	•	•
Through-hull Transducers										
A102114	R209	Plastic	•		•	38/50/185/200	3000w	•	•	
A102116	R309	Plastic	•		•	28/38/185/200	3000w	•	•	
A102118	SS270 Wide Beam	Stainless	•		•	50/200	1000w	•	•	•
Sensors										
A102119	CS4500	Plastic		•	•	–	–	•	•	•
A102120	T42	Plastic			•	–	–	•	•	•





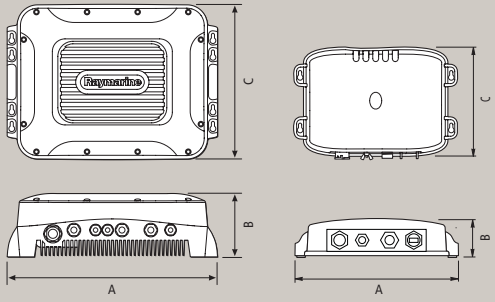
SPECIFICATIONS

Nominal voltage	DSM30 12V systems DSM300 & DSM400 12/24V Systems
Absolute voltage range	DSM30 10.7 – 18V DC; DSM300 & DSM400 10.7 – 32 V DC
Current consumption	0.5A (8.0A peak)
Frequency	DSM30 200kHz / 50 kHz DSM300 Dual 200kHz / 50 kHz DSM400 28 / 38 / 50 / 185 / 200 kHz
Nominal power output	DSM30: 600W DSM300: 1000 or 600W DSM400 1 / 2 / 3 KW (transducer dependant)
Temperature range	-10°C to +50°C operating -20°C to +70°C non operating
Humidity	up to 95%
Waterproofing standard	CFR46 and IPX6 (DSM400: CFR46)
Weights	DSM30 / DSM300 1kg (2.2lbs) DSM400 12.25kg (27lbs)

ORDERING INFORMATION

E63074	DSM30 600 Watt Digital Sounder Module
E63069G	DSM300 1000 Watt Digital Sounder Module
E63072	DSM400 3000 Watt Digital Sounder Module

For A Series, turn to pages 28 to 31



DSM400 DSM30 / DSM300

Dimensions

DSM30	A: 273.3mm	B: 61.7mm	C: 187.2mm
DSM300	A: 273.3mm	B: 61.7mm	C: 187.2mm
DSM400	A: 415mm	B: 125mm	C: 305mm

PHOTO: SESSA MARINE

SATELLITE TV ANTENNA SYSTEMS

Raymarine's Satellite TV antennas bring the same combination of high performance and ease-of-use to your onboard entertainment that you would expect from your home entertainment system. Housed in a compact dome, our antenna systems automatically track and receive satellite TV signals in almost any conditions – guaranteed quick, clear, reliable access to hundreds of digital channels.

They're easy to fit and operate with simple cabling, an intuitive control unit and the reassurance of Raymarine's worldwide service and support network.

Better technology – better reception

Unique Wide Range Search (WRS) technology means Raymarine's antennas can identify and acquire satellite signals as quickly as possible. When you've got a fix on the satellite signal you want, the tracking algorithms will help ensure you keep it.

They're built to cope with tough conditions, too. Dynamic Beam Tilting (DBT) continuously measures, and compensates for your vessel's heading, pitch and roll – keeping your antenna locked on a satellite for a clear picture, whatever the weather or waves are doing.

33STV: Ultra compact for smaller vessels

The perfect choice for owners of small power and sailboats from 6m – 7.6m (20' – 25') looking to experience the best in on-board entertainment.

37STV: Compact, light-weight and easy to install

The space saving 37STV system is designed for vessels between 7.6m – 10.7m (25' – 35'). At just 37cm (14.5") diameter, this antenna is perfect for tight locations.

Antenna Control Unit

- Provides power to the antenna.
- Displays antenna status.
- Contains diagnostic indicators.
- Enables manual satellite selection.
- Connects to PCs for easy upgrades.

45STV: Multiple satellite receiver capabilities

The perfect blend of size and performance, the 45STV makes satellite television at sea a reality for owners of 10.7m – 15m (35' – 50') vessels.

60STV: The high-performance choice

The 60STV extends satellite coverage with enhanced satellite tracking in regions prone to weaker satellite signals. The 60STV satellite antenna system is designed for vessels 15m (50') and over. 60STV offers all the advantages of the 45STV, plus a few more. Automated Skew Control (Premium model only) ensures maximum signal strength while under way by optimising the LNB skew position.

Dual or Quad LNB

Connect multiple television receivers and tune in to different channels on each television – the Dual systems (33 and 37STV) allow the connection of two television receivers and the Quad systems (45 and 60STV) four.

PHOTO: NORD WEST YACHTS AB

PHOTO: WINDY BOATS AS

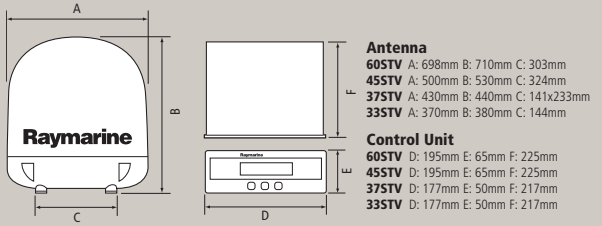
SATELLITE TV FEATURES	33STV	37STV	45STV	60STV PREMIUM
Dual or Quad LNB design for multiple receivers	Dual	Dual	Quad	Quad
DVB (Digital Video Broadcast) compatible	●	●	●	●
Dome diameter (cm)	33	37	45	60
Wide Range Search Algorithm for high speed search and fast satellite acquisition	●	●	●	●
Dynamic Beam Tilting (DBT) technology signal tracking in extreme weather and sea conditions	●	●	●	●
High Definition (HD) compatible	●	●	●	●
Enhanced signal reception and improved antenna gain for better performance in poor weather				●
NMEA 0183 GPS position input capability for reduced acquisition time	●	●	●	●
Conical scanning detects strongest satellite signal for enhanced stabilisation	●	●	●	●
Wide elevation angles to maintain satellite fix				●
Automatic LNB skew control				●
Rotating sub-reflector redirects signal for reduced dish movement and quieter operation	●	●	●	●
Suggested vessel size	20' – 25'	25' – 35'	35' – 50'	over 50'

SPECIFICATIONS

Operating voltage	37STV and 60STV: 10.8 to 15.6V DC; 33STV and 45STV: 9 to 30V DC
Weight kg (lbs)	60STV: 19 (41.8); 45STV: 15 (33); 37STV: 9 (19.8) 33STV: 4.5 (9.9)
Frequency	Ku-Band
Azimuth range	680°
Antenna gain	33STV: 31dBi; 37STV: 32dBi; 45STV: 33 dBi; 60STV: 36 dBi
Minimum EIRP	33STV: 51dBW; 37STV and 45STV: 50 dBW; 60STV: 47 dBW
Elevation range	33STV and 37STV: +10° to 80°; 45STV: 0° to +90°; 60STV +5° to +90°
Pitch and roll range	roll ±25° / pitch ±15°
Tracking rate	33STV and 37STV 60° / sec; 45STV: 50° / sec; 60STV 45° / sec

ORDERING INFORMATION

E93007	60STV standard European version
E93008	60STV premium European version
E93011	60STV Australia, China and New Zealand version
E93012	60STV Middle East version
E93003-2	45STV MKII European / S. American version
E93004-2	45STV Australia, China and New Zealand version
E93013-2	45STV US HD system pack
E93018	37STV European version
E42128	37STV Australia, China and New Zealand version
E42171	33STV European version
E42170	33STV North America



Antenna
60STV A: 698mm B: 710mm C: 303mm
45STV A: 500mm B: 530mm C: 324mm
37STV A: 430mm B: 440mm C: 141x233mm
33STV A: 370mm B: 380mm C: 144mm

Control Unit
60STV D: 195mm E: 65mm F: 225mm
45STV D: 195mm E: 65mm F: 225mm
37STV D: 177mm E: 50mm F: 217mm
33STV D: 177mm E: 50mm F: 217mm

AIS500 TRANSCEIVER AND AIS250 RECEIVER

Automatic Identification System (AIS)
Operating in the VHF maritime band, the AIS system enables the wireless exchange of navigation status between vessels and shore-side traffic monitoring centres. Commercial ships, ocean-going vessels and recreational boats equipped with AIS transmitters broadcast AIS messages that include the vessel's name, course, speed and current navigation status.

BASIC AIS COMPARISON	AIS250	AIS500
Listen only AIS receiver	●	●
Class B AIS transceiver		●
Built-in VHF splitter	●	●
Built-in NMEA multiplexer	●	●
16 channel external GPS antenna included		●

AIS250 Receiver Module

The Raymarine AIS250 Receiver module is a 'listen only' dual-channel AIS receiver that easily integrates with Raymarine multifunction systems.

- Switched dual channel, multiplexed system – a single receiver uses sophisticated software to monitor AIS Class A and B transmissions over standard VHF frequencies.
- Overlay AIS targets on Raymarine multifunction displays in both chartplotter and radar modes.
- AIS target tracking enhances your situational awareness by monitoring a target's name, course, speed and navigation status.
- Reconcile AIS targets with radar targets for added safety.
- Built-in VHF/FM antenna splitter. No additional antenna required.
- Two NMEA 0183 input and two NMEA 0183 output ports with a built-in multiplexer for easy installation.

System Requirements

- VHF Antenna.
- Chartplotter, multifunction display or PC application with NMEA 0183 input and AIS compatibility.
- Raymarine multifunction display requirements:
  C Series software version 4.29.
  E Series software version 4.29 or higher.

AIS500 Transceiver Module

The AIS500 is a class B AIS transceiver allowing you to receive and transmit AIS navigation status information between vessels and shore-based traffic centres.

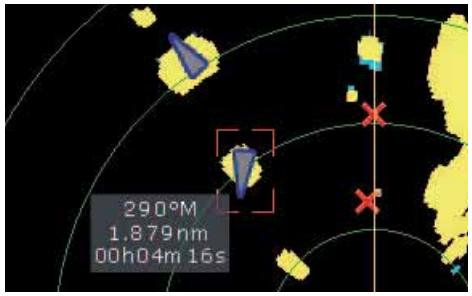
- Dual channel receivers – AIS vessel monitoring of class A and B transmissions.
- Built-in NMEA multiplexer enables multiple NMEA 0183 connections to the single NMEA input and output ports on Raymarine displays.
- VHF splitter permits sharing of a single antenna with radio and AIS.
- Includes external GPS antenna.
- SeaTalk^{NG} networking – compatible with Raymarine E series Classic and G Series displays and C Series Widescreen and E Series Widescreen in 2010.

PHOTO: JOE MCCARTHY

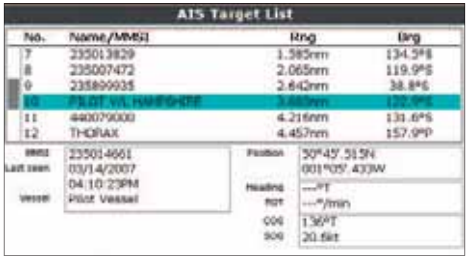
- NMEA 0183 compatibility with Raymarine A Series, C Series Classic, C Series Widescreen, E Series Classic, E Series Widescreen and G Series and other manufacturers capable of displaying AIS targets.
- Buddy tracking – distinguish favourite targets (MMSIs) from others by adding to favourites list (not available with C Series Classic).
- Silent mode disables the transmit function (AIS500 only) – prevent tracked when racing or at your favourite fishing spot. (Not available with C Series Classic.)
- Easy Installation and configuration.

Basic chart-overlay AIS target information

Detailed AIS target information



Overlay AIS targets with radar contacts on Raymarine multifunction displays.



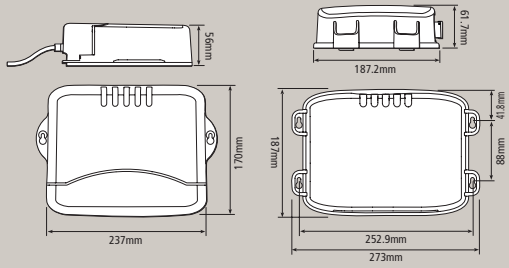
Typical AIS target list

AIS SPECIFICATIONS

Operating voltage	10.8 – 32V DC
Power consumption	200mA (AIS250) 620mA (AIS500)
Dimensions	AIS250: 237x170x55mm (WxHxD) AIS500: 237x187x62mm (WxHxD)
Weight	0.54kg (1.2lbs)
Mounting method	bulkhead
NMEA input (0183)	1x 38400 / 1x 4800 Baud
NMEA output (0183)	1x 38400 / 1x 4800 Baud
Operating frequencies	161.975 and 162.025MHz (multi-plexed)
Channel spacing	25kHz
Sensitivity	< -109dBm (receiver only)
Data rate	38400 / 4800 Baud
Format	NMEA 0183
NMEA sentence	VDM

ORDERING INFORMATION

E03015	AIS250 receiver module
E62235	AIS500 transceiver module
R08278	AIS250 to VHF cable (3m)
R08277	AIS250 Power cable (1.5m)



AIS250 **AIS500**

MARINE CAMERAS

CAM100

The CAM100 is a day and night camera that transforms Raymarine C Series Widescreen, E Series Widescreen, E Series and G Series into powerful onboard video observation systems, recommended for exterior applications. Improve docking safety by monitoring blind spots or keep track of the crew and an eye on the engine room from the helm. From the flybridge to saloon, monitor any activity, or use multiple cameras for a total view of your vessels surroundings. The camera uses a highly sensitive IR sensor to switch from true colour to black and white night vision mode.

Reverse Image Cameras

Choose the CAM100 with Reverse Image for aft deck or engine room applications.

Features:

- Plug and play with Raymarine E Series Widescreen, E Series, G Series and C Series Widescreen.
- Automatic switching between true colour (day) and black and white (night).
- Automatic IR LED on/off with photo sensor.
- Excellent colour reproduction.
- Up to 15m (49') total darkness visibility in night mode (black and white).
- Clear-focus at night with anti distortion technology.
- 14 Infrared leds.

PHOTO: JOE MCCARTHY

PHOTO: DRETTMANN

PHOTO: RIVIERA

CAM50

The ideal camera for interior installations. Unobtrusive dome design is ideal for mounting in the saloon, wheel house or engine room.

Features:

- Available in normal view or choose CAM50 reverse image version.
- Plug and play with Raymarine E and G Series.
- Ceiling or wall mount.
- Adjustable field of view.
- High quality imager.
- Excellent colour reproduction.

PHOTO: JOE MCCARTHY

BASIC CAMERA COMPARISON	CAM50	CAM100
Designed for interior installations	●	●
For external installations		●
Compatible with G Series, E Series and C Series Widescreen	●	●
Compatible with G Series and E Series displays	●	
Image (pixels)	500 x 582	752 x 582

PHOTO: SUNSEEKER

PHOTO: BENETEAU GROUP

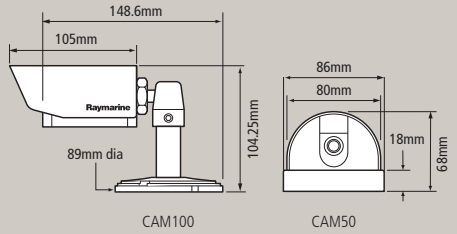
PHOTO: NB MARINE

SPECIFICATIONS

Operating voltage	12V DC (+30% -10%)
Power consumption	CAM100: 130mA day, 280mA night IR on at 12V DC; CAM50: 80mA at 12V DC
Weight kg (lbs)	CAM50: 0.28 (0.63) CAM100: 0.31 (0.68)
Connections	Power connection: 12V tinned leads; Video connection: male BNC
Imaging format	CAM100: PAL 752 x 582 pixels; CAM50: PAL 500 x 582 pixels
Horizontal resolution	CAM100: 550TVL CAM50: 380TVL
Format / scanning system	PAL 625 lines, NTSC 525 lines 2:1 interlaced
Video output	Composite 75ohms

ORDERING INFORMATION

E03007	CAM100 (NTSC) camera for USA and Canada
E03006	CAM100 (PAL) camera for Europe and RoW
E03021	CAM100 (NTSC) reverse image
E03020	CAM100 (PAL) reverse image
E03016	CAM50 (NTSC) camera for Europe and RoW
E03017	CAM50 (PAL) camera for Europe and RoW
E03018	CAM50 (NTSC) reverse image
E03019	CAM50 (PAL) reverse image
E06017	Camera extension cable – 5m
E06018	Camera extension cable – 15m



LIFETAG MAN OVERBOARD SYSTEM

LifeTag is a personal man overboard (MOB) system that consists of a base station and wireless tags worn by crew members, family or pets. LifeTag can be used as a standalone system or integrated into a Raymarine SeaTalk network.

How does it work in standalone configuration?
If a crew member falls overboard, or strays out of range – typically 9m (30') – contact with the base-station is lost and a loud alarm sounds.

How does it work in a SeaTalk network?
If you have a Raymarine SeaTalk network equipped with Raymarine multifunction displays or ST60+, ST70 or ST70+ instruments, an emergency Man Over Board alarm will be activated on the multifunction displays and instruments. In addition, the multifunction display will show an emergency waypoint (999) (except ST70+) which is created automatically when the alarm is activated; it will also show the co-ordinates of and the bearing to that emergency waypoint. If the SeaTalk network contains an ST60+ Graphic, then

this too will automatically display the co-ordinates and bearing. This information can then be used to navigate back to the position where the MOB alarm was activated.

PHOTO: OMER VAN DER WAL

PHOTO: JEANNEAU (BENETEAU GROUP)

General Features

- Basic system includes 2 LifeTags and a base station.
- System can be expanded (extra LifeTags sold separately) to monitor up to 16 LifeTags. Larger boats may be covered by additional base stations.
- Supplied velcro strap enables LifeTags to be fitted around the wrist of an adult or child, an article of clothing, belt loop or a pet's collar.
- LED for status feedback.
- Replaceable CR2 Lithium batteries supplied – expected battery life is one year (with over 2000 operational hours).
- Tags will power off automatically, whilst remaining fully operational.

LifeTag Base Station Features

- Handles communication with each LifeTag.
- Outputs for external alarm siren.
- Secondary output for activating other systems.
- 12V DC power or can be powered by SeaTalk network.

LifeTag Alarm

- Extra loud alarm sound.
- Simple two wire connection to base station.

PHOTO: RIVIERA

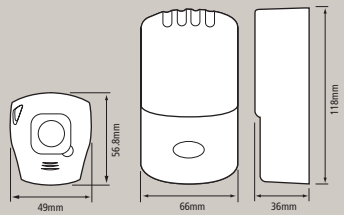
SPECIFICATIONS

TAG	
Power	non-rechargeable CR2 3V lithium battery
Transmitted power	1mW
Dimensions	49 x 56.8 x 24.4mm (W x H x D)
Max number tags	16 per system
BASE STATION	
Power	8–16V DC external supply
Base station range	typically 9m (30') from base station to tag
Dimensions	66 x 118 x 36 (W x H x D)

ORDERING INFORMATION

E12185	LifeTag system: 2 LifeTags, base station and alarm
E15026	Additional LifeTag
E18030	LifeTag base station

For detailed product specifications, please go to our website www raymarine.com



LifeTag System Warning:
The Raymarine LifeTag system is an aid to crew safety, and is an enhancement only of a vessel's main crew safety system. It is the responsibility of the captain and all crew members to ensure that all safety instructions and procedures are in place and obeyed with local requirements. Failure to operate this system in accordance with the operating instructions may result in unreliable or reduced system performance.

VHF COMMUNICATIONS

Raymarine's communications systems combine innovative, state-of-the-art technology with rugged waterproof construction, designed to withstand life at sea.

Select the right radio for your boat – single or multi-station VHFs, Class D DSC (Digital Selective Calling) with SeaTalk and NMEA connectivity. Whether blue water cruising or fishing inshore, Raymarine have what you need for communication safety at sea.

What is DSC?
Digital Selective Calling (DSC) is a global protocol that uses channel 70 (156.525 MHz) to transmit and receive digital messages. It works on DSC equipped VHF radios and is used for individual, 'all ships' and distress calls. DSC also enables you to selectively alert single or multiple boaters of incoming VHF calls by using stored MMSI (Maritime Mobile Service Identification) numbers, similar to making a phone call.

You can also poll another boat to obtain its GPS position and display it on a Raymarine multifunction display.

DSC safety digital Mayday.
If you are unfortunate enough to find yourself having to make a mayday call, the last thing you need is extra complication. Making a DSC distress call is simple with Raymarine's DSC equipped VHFs. Just press the button, clearly marked in the back of the handset, and GPS position and time information are transmitted in a digital 'packet' complete with the vessel's Maritime Mobile Service Identification (MMSI) telling other ships and shore stations exactly where you are and that you are in a distress situation. This simple procedure can dramatically increase your chance of a successful rescue compared to a traditional Mayday voice call.

PHOTO © JOE MCCARTHY

PHOTO © JOE MCCARTHY

VHF product options…

Modular: Ray240E Class D DSC VHF Radio
The modular Ray240E consists of a receiver / transmitter module and a waterproof cell phone style handset and remote speaker. There's an optional hailer horn with manual and automatic fog signals for vessels underway, at anchor and more. It can also be expanded with a 2nd handset and speaker.

Fixed mount: Ray218E high performance VHF
The Ray218E is Raymarine's premier fixed mount VHF radio with a long list of standard features. The Ray218E can be expanded with the optional Raymic remote handset that offers full function radio control and intercom from a remote on board station.

Fixed mount: Ray55E full featured compact VHF
A compact powerhouse, the Ray55E VHF radio offers performance and style. Expand the Ray55E with the powerful Raymic remote handset.

Fixed mount: Ray49E ultra compact VHF
The Ray49E VHF is our most compact fixed mount DSC VHF radio. Ideal for smaller boats, the Ray49E features crystal clear audio and remote microphone controls.

Handheld: Ray101E handheld VHF
The Ray101E is a feature-rich, handheld VHF radio powered by long-lasting NiMh rechargeble batteries.

Ray240E Modular VHF radio

Ray218E Fixed Mount Class D DSC VHF

Ray55E Fixed Mount Class D DSC VHF

Ray49E Fixed Mount Class D DSC VHF

FEATURES	RAY240E	RAY218E	RAY55E	RAY49E
Class D DSC (Digital Selective Calling) transceiver	●	●	●	●
'DSE' NMEA sentence for 3 decimal position precision	●	●	●	●
DSC Distress key transmits GPS position and a digital mayday	●	●	●	●
Dual and Tri Watch	●	●	●	●
Built-in Hailer with "Listen Back" capability and automatic fog horn	22 Watt	30 Watt		
NMEA 0183 input with GPS Position, COG and SOG display	No SOG or COG	●	●	●
Chartplotter position polling using NMEA 0183 output	●	●	●	●
Easy-to-use rotary controls for channel, volume, squelch and menu operation		●	●	●
Extra large dot matrix LCD	●	●	●	Segmented LCD
Speaker microphone with controls and remote mount option		●	●	
Dual Channel Display (2UP Mode) displays active channel and standby channel		●	●	
Programmable favorite channel soft keys (1UP Mode)		●	●	
Quick Access 16/Plus Key	●	●	●	●
4 Scan modes: All scan, saved (memory) scan, priority all scan and priority saved scan	●	●	●	●
Programmable Scanning	●	●	●	●
Submersible (IPX7 Standard)	●	●	●	●
Superior receiver with excellent intermodulation rejection		●	●	
Rugged housing with a low profile bezel using the optional flush mount kit		●	●	●
Optional Raymic remote station handset serves as full function second station		●	●	
External speaker output	●	●	●	●
NMEA 0183 input	●	●	●	●
Powered Loudspeaker with On/Off Switch	●			
Phone style handset with alphanumeric keypad	●			
Second station option	●	RayMic	RayMic	
ATIS (optional)	●	●	●	●

PHOTO © JOE MCCARTHY

RayMic
Optional handset for Ray218E and Ray55E VHF radios providing a complete hand-held, full-function, second station or an intercom handset.

Ray101E Handheld VHF Radio

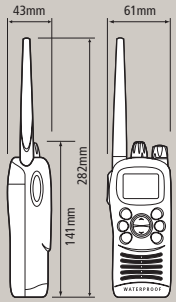
Rugged and reliable, the Ray101E uses long lasting Nickel Metal Hydride (NiMH) batteries with 1300mA capacity. User friendly, the Ray101E has easy left or right hand operation with backlit keys and large LCD display. Supplied with 6 NiMH rechargeable cells, quick charger, charger base, wrist strap and belt clip.

Features

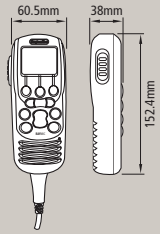
- Large high-contrast LCD display.
- Backlit keys and backlit LCD display for night time use.
- Rapid drop-in charger and Nickel Metal Hydride batteries for charging at anytime.
- Battery tray accepts both AA size NiMH and Alkaline batteries.
- No expensive battery packs required.
- 12v cigarette lighter adapter included.
- Wrist strap and belt clip included.
- Quick access 16 Plus priority key.
- Tri-watch.
- Rotary volume and squelch controls.
- 3 year limited warranty.
- IPX7 waterproof standard: submersible to 1 metre for at least 30 minutes.

Ray430

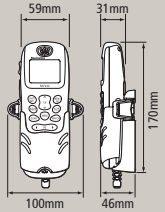
The Ray430 loudhailer has eight foghorn signals, including an automatic foghorn when underway. Connect it to a vessel security system for an extra loud alarm siren if a sensor is activated, or add up to four remote intercom stations for complete onboard communications. 30 watts of output power means you will be loud and clear!



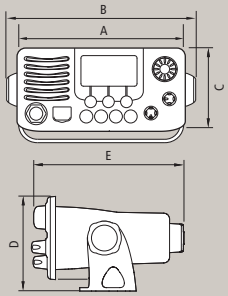
Ray101E



RayMic



Ray240E Handset



Fixed Mount VHF Dimensions (mm)

Ray218E	A: 198	B: 225.5	C: 97.5	D: 112.5	E: 179.3
Ray49E	A: 167	B: 179.0	C: 73.0	D: 90.3	E: 175.0
Ray55E	A: 172.3	B: 191.0	C: 80.0	D: 93.8	E: 174.0

3 Years Standard VHF Radio warranty

VHF radio specifications

For detailed communications specifications and additional product information, please go to our website www.raymarine.com

Ordering information

E42002	Ray240E VHF (Europe – RoW)
E42002-UK	Ray240E VHF (Europe) (UK)
E45002	Ray240E (Europe) second station
E45003	Ray240E active loudspeaker
E43032	Ray218 VHF (US)
E43033	Ray218E VHF (Europe – RoW)
E43033-UK	Ray218E VHF (UK)
E43034	Ray49 VHF (US) (grey)
E43035	Ray49E VHF (Europe – RoW) (grey)
E43035-UK	Ray49E VHF (grey) (UK)
E43036	Ray55 VHF (US)
E43037	Ray55E VHF (Europe – RoW)
E43037-UK	Ray55E VHF (UK)
E43028	Ray101E handheld VHF (Europe – RoW)
E43028-UK	Ray101E handheld VHF (UK)
T43029	Ray101E handheld VHF (UK) with power adaptor
T43030	Ray101E handheld VHF (AUS / NZ) with power adaptor
T43031	Ray101E handheld VHF (EU – RoW) with power adaptor
A46052	RayMic second station (10m cable)
M95997A	Ray430 Loudhailer – no hailing horn
M95435	Hailing horn speaker
M95998	Intercom speaker

RAYTECH NAVIGATION SOFTWARE

Raymarine's RayTech RNS is a powerful and flexible software package that can be used for route planning, performance analysis, fishing charters, weather forecasting, tactics... a multitude of uses.

Quick to do, easy to use, you will be able to plan your routes, add in waypoints on your PC at home and then transfer the data to your onboard Raymarine displays. Once you get to like it, give yourself the advantage and go for the full version of RayTech RNS.

PHOTO: OYSTER MARINE LTD (UK)

PHOTO: OYSTER MARINE LTD (UK)

Features

- Take your PC onboard and access radar, digital fishfinder, charts and navigation data instantly with Raymarine multifunction displays.
- Support for vector, raster, 3D bathymetric and aerial photo cartography.
- Compatible with all Navionics® format charts on compact flash (except Navionics Classic).
- Compatible with Maptech® BSB v2.0-v4.0 Raster Charts, Softchart Raster Charts, NDI Raster Charts and NOAA Raster Navigation charts (RNC).
- Plan waypoints and routes, then transfer them between your PC, Raymarine multifunction displays.
- SeaTalk*HS* networking through your PC's ethernet port.
- Built-in worldwide tides and currents database.
- Raymarine analogue and HD Digital radar support.
- Raymarine HD Digital Sounder Module support.
- AIS target tracking.

SPECIFICATIONS

System connectivity	For latest system connectivity information, please go to our website www.raymarine.com
Minimum system requirements	
Processor	Pentium IV (equivalent) or faster
RAM memory	512MB minimum
CD ROM drive	yes
Inputs	USB, Ethernet, Serial and ethernet (serial and PCMCIA also supported)
Recommended system requirements	
Processor	Intel Core 2 Duo processor or faster (or equivalent)
Video	NVidia GeForce 4 video card or better (or equivalent)
RAM memory	1GB or higher (2GB for Windows Vista)
Interfaces	
NMEA 0183 input / output	via RS232 serial 9 pin data cable
SeaTalk	via RS232 serial data cable through optional E85001 PC / SeaTalk interface
SeaTalk*HS*	10 / 100 network port required
Navionics USB multi card reader	USB (optional – included in box)
Supported cartography	
Navionics Gold/Platinum	via Navionics compact flash card reader or SeaTalk*HS* from E Series
C-MAP NT / NT+ C-Cards	via C-MAP USB card reader (orange reader not supported)
	Also compatible with Maptech® BSB v2.0-v4.0 Raster Charts, Softchart Raster Charts, NDI Raster Charts and NOAA Raster Navigation charts (RNC).

ORDERING INFORMATION

E112111	RayTech RNS navigation software
E112112	RayTech RNS navigation software upgrade
E112113	RayTech RNS planner CD
E86001	PC serial cable
E86026	Navionics card reader
E85001	PC / SeaTalk / NMEA interface box

PHOTO: JOE MCCARTHY

NEW Available mid-season 2010

PB200 WEATHER STATION

PB200 Weather station

The PB200 WeatherStation is ideally suited to use on large powerboats. It has internal temperature and barometric pressure sensors to help predict changing weather patterns. Wind Speed and Direction are measured using four ultrasonic transducers. There are no moving parts, which also helps to enhance durability and reliability. In addition to the internal WAAS/EGNOS GPS engine, the PB200 uses an integral three-axis solid-state compass and wind sensor to provide both Apparent and True Wind Speed and Direction without the need for additional sensors. There is also an internal heading sensor.

Features

- Barometric pressure.
- Air temperature.
- Wind chill temperature.
- True wind speed and direction.
- Apparent wind speed and direction.
- Measures wind speed and direction ultrasonically.
- Three-axis solid-state compass.
- Three-axis accelerometer provides pitch and roll information in dynamic conditions.
- Better than 1° compass accuracy in static conditions.
- Best-in-class 2° compass accuracy in dynamic condition.
- Yaw rate gyro provides rate of turn data.
- Outputs NMEA 0183 and NMEA/ST*NG* 2000® data.
- Uses WeatherCaster™ Software.
- Maintenance-free operation – no moving parts.
- Easy installation and two-year warranty.

SPECIFICATIONS

Wind speed range	0 to 80 knots (0 to 92 mph)
Wind speed resolution	0.1 knots (0.1 mph)
Wind speed accuracy at 0° to 55°C no precipitation	Low wind speeds: 0 to 10 knots ± 1 knot +10% reading. High wind speeds: 10 to 80 knots ±2 knots or 5% RMS whichever is greater
Wind speed accuracy in wet conditions	5 knots RMS
Wind direction resolution	0.1°
Wind direction range	0° to 360°
Compass accuracy	1° RMS when level 2° RMS for pitch and roll up to 30° 3° RMS for pitch and roll up to 45°-
Wind speed accuracy at 0° to 55°C with no precipitation	Low wind speeds: 4 –10 knots 6° RMS typical. High wind speeds: up to 10 knots 3° RMS typical.
Wind direction accuracy in wet conditions	> 8 knots – 8° RMS typical
Pitch and roll accuracy	± 50° / <1°
Air temperature range	-25°C to 55°C
Air temperature resolution	0.1°C
Air temperature accuracy	± 1°C at >4 knots wind
Barometric pressure resolution	1.1mbar
Barometric pressure range	850mbar to 1150mbar
Barometric pressure accuracy	± 20mbar when altitude correction is available
GPS position accuracy	3m with WAAS / EGNOS (95% of the time, SA off)
Operating temperature range	–25°C to 55°C
Supply current	<220mA
Supply voltage	9 to 16V DC
Weight	285g (0.7lB)

ORDERING INFORMATION

A22157	PB200 Weather Station

PHOTO: COPYRIGHT CLASSIC BOAT MAGAZINE

THE INSTRUMENTS OF CHOICE WORLDWIDE

Raymarine has the instruments for you whatever your boating requirements – from the compact but powerful ST40 series to the high-end, large-screen ST70+ with dedicated keypads.

ST70+ multifunction display
The ST70+ instrument display is designed for sail and powerboats over 12m (40') and is the perfect partner for Raymarine multifunction display systems. Ideal for installations where information is viewed at a distance or you simply want to view information in a large format.

ST70 multifunction display
ST70 offers a new way of visualising instruments and autopilot control. With high-resolution colour displays, ST70 are versatile and easy to use.

ST60+ dedicated displays
Enhanced mono displays ensure superior viewing angles for both day and night conditions. Simple, push-button controls make ST60+ instruments extremely easy to use.

ST40 dedicated displays
These compact mono displays are ideal for smaller powerboats, yachts and RIBs.

PHOTO: © JOE MCCARTHY

ST40 Instrument

ST60+ Instrument

ST70 Instrument

ST70+ display in Instrument mode

BASIC INSTRUMENT COMPARISON	ST40	ST60+	ST70	ST70+
Display				
Segmented mono LCD display (size in mm)	88	92		
Dot matrix mono LCD display (Graphic)		92		
Analogue dial display with 34mm segmented LCD		●		
Colour LCD display (size in mm)			89	165
Dedicated or multifunction display	Dedicated	Dedicated	Multifunction	Multifunction
Function keys located on display	●	●	●	
Displays operated by dedicated keypads				●
Surface or flush mounting options	●	●	●	●
Bracket mounting option	●	●		
Network type	SeaTalk[1]	SeaTalk[1]	SeaTalk*NG*	SeaTalk*NG*
Illumination levels	3 levels + off	3 levels + off	Multiple	Multiple
Unit size (W x H) in mm	126 x 70	110 x 115	110 x 115	189 x 152

BASIC FUNCTIONS COMPARISON	ST40	ST60+	ST70	ST70+
Functions				
Speed	●	●	●	●
Depth	●	●	●	●
Wind	●	●	●	●
Engine / Fuel			●	●
Navigation			●	●
Distance and time	●	●	●	●
Heading	●	●	●	●
Temperature	●	●	●	●
Environment	●	●	●	●
Battery			●	●
GPS			●	●
Pilot mode			●	●

NEW Alternative bezel to match new E Series Widescreen displays – available Spring 2010.

ST70+.
FOR THE BIGGER PICTURE

The ST70+ instrument display is designed primarily for sail and powerboats over 12m (40') and is the perfect partner for Raymarine multifunction display systems. The large, high visibility, 165mm (6.5") LCDs are ideal for installations where information is viewed at a distance, perhaps mounted on the mast or on a large bridge, or you simply want to view information in a large format at close range at the navigation station or helm.

Like the smaller ST70 instrument display, ST70+ is fully customisable, allowing you to view information when you want it and where you want it, be it in digital or analogue format, full screen or in user defined windows selected from any of 17 configurations.

The button-less displays are operated by dedicated keypads – there's a push-button only pilot keypad for sailboats, a rotary pilot for powerboats and a combination push button and rotary instrument keypad for complete control of all instrument features.

General features

- Large 6.5" (165mm) VGA colour LCD display.
- Wide viewing angle for superb visibility.
- Sunlight viewable display.
- 4:3 Screen format (640 x 480 pixels).
- SeaTalk^{NG} connectivity.
- Installation options include surface mount, flush mount or rear panel mounting.
- Choice of 5 colour palettes, including red on black for night vision and inverse white on black for enhanced clarity in bright conditions.
- Fully waterproof to IPX6 standard.
- High quality graphics.
- User defined instrument data pages.
- 17 screen template/layout options.
- Each page can be customised and turned on/off as required.
- Language options. UK English; US English; French; German; Danish; Dutch; Spanish; Italian; Norwegian; Finnish; Swiss; Swedish; Portuguese; Russian; Chinese; Japanese; Korean and Greek.
- Screen can be configured as an instrument or an autopilot display (at set-up).
- Intuitive operating menu and functionality with large bright icons.

ST70+ displays are operated using dedicated keypads

Speed
- Velocity Made Good (VMG) to Waypoint.
- Speed and Speed Over Ground.
- Max Speed and Average Speed.
- VMG to Windward.
- Trolling speed.

Wind
- Apparent wind speed and wind angle.
- True wind speed and true wind angle.
- Ground Wind Direction (GWD).
- Cardinal.
- Beaufort scale.
- Wind speed and wind direction log.
- Min/max Apparent wind speed.
- Min/max True wind speed.
- Min/max Apparent wind angle.
- Min/max True wind angle.

Fuel
- Fuel level.
- Fuel flow – instantaneous.
- Fuel flow – average.
- Distance to empty.
- Fuel economy.

Battery
- Battery voltage.
- Battery amps.
- Voltage (of the unit).
- Battery temperature via NMEA 2000.

Engine
- Engine RPM.
- Fuel flow.
- Battery amps.
- Engine hours.
- Trim position.
- Oil pressure and temperature.
- Coolant temperature.
- Boost pressure.
- Coolant pressure.
- Display and calibration of Bennetts and trim tabs.

Environmental
- Sea temperature.
- Barometric pressure.
- Sunrise and sunset.
- Sea temperature (min/max).
- Air temperature.
- Air temperature (min/max).
- Set and drift.
- Dew point.
- Wind chill (true and apparent).
- Humidity.

GPS
- Course Over Ground (COG).
- Speed Over Ground (SOG).
- Latitude and Longitude (Lat/Lon).
- Satellites.
- Satellites and horizontal dilution of precision (HDOP).

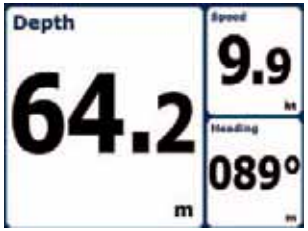
Distance and Time
- Log and trip.
- Local time.
- Local time and date.
- Race timers.

Depth
- Depth (feet, fathoms or metres).
- Depth log.
- Minimum depth.
- Maximum depth.

Navigation
- Course Made Good (CMG).
- Distance Made Good (DMG).
- Bearing and Distance to Waypoint (BTW and DTW).
- Cross Track Error (XTE).
- Estimated Time of Arrival and Time To Go (ETA and TTG).

Pilot Mode
- Rudder angle.
- Course to steer.
- Pilot heading.

Heading
- Heading.
- Locked heading.
- Tack heading.



Full screen digital with standard white palette.

Menu with red palette.

Typical menu screen.

PHOTO: JEANNEAU (BENETEAU GROUP)

Instrument Keypad
The instrument keypad controls all the instrument functions via a series of push buttons and a multifunction 'Unicontrol' interface.

Power Pilot Keypad
The power pilot keypad is designed specifically for powerboats.

- Dedicated buttons engage and disengage the pilot.
- Unicontrol allows you change course.
- Dodge also available on the sail keypad – needs an SPX pilot to activate.

Sail Pilot Keypad
Designed specifically for sail boats.

- Dedicated buttons to engage and disengage the autopilot, perform a dodge manoeuvre and track to a waypoint.
- Course adjustments are made using the port and starboard -1, +1, -10 and +10 keys.

Connection system
SeaTalk^{NG} compact connectors enable quick yet secure networking.

ST70+ GENERAL SPECIFICATIONS

Voltage range	10 –16 V DC
Power consumption	700mA (max)
Keypad dimensions	136 x 92 x 56 (power and instrument) 136 x 92 x 42 (sail) (WxHxD)
Weight kg (lbs)	Display 0.9 (1.98), keypads 0.3 (0.66)
Mounting method	low profile flush or surface mount (fully sealed behind panel mount)
Control type	dedicated keypad
Display	165 mm (6.5") sunlight viewable VGA (640x480 pixels)
Colour palettes	5, including inverse video (white text with black background) night mode (red text with black background)
Display lighting	white LED, sliding scale
Connectors	2 SeaTalk^{NG} connectors, 1 power connector
Interfaces	SeaTalk^{NG}, NMEA 2000
Languages	18 (see page 64)
Instrument page options	8
Page layout options	17

ORDERING INFORMATION

E22115	ST70+ Display
E22116	ST70+ Instrument Keypad
E22117	ST70+ Sail Keypad
E22118	ST70+ Power Keypad

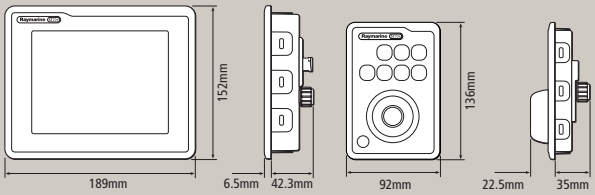


PHOTO: SUNSEEKER INTERNATIONAL LTD

ST70. MULTI-TALENTED COLOUR DISPLAYS

Designed for simple setup and extensive user customisation, ST70 offers an array of intuitive digital, analogue, graphical and historical display options. Next generation ST70 systems are built on Raymarine's new SeaTalk^{NG} network architecture.

The SeaTalk^{NG} network enables even easier interconnection of multiple ST70 instruments, transducers and NMEA 2000 compatible devices. ST70 also integrates with existing Raymarine SeaTalk and SeaTalk^{2} systems.

Connection system
SeaTalk^{NG} compact connectors enable quick yet secure networking.

PHOTO: SUNSEEKER INTERNATIONAL LTD

General Features

- 8 user defined instrument data pages.
- 16 screen layout options available for each data page.
- Each page can be customised and turned on/off as you require.
- Start-up wizard helps you to automatically configure each ST70 display.
- 10 languages available: UK English, US English, Spanish, French, German, Dutch, Italian, Swedish, Danish and Norwegian.
- Easy-to-use carousel menu makes setup easy.
- Sunlight viewable TFT colour display.
- 89mm (3.5") 320 x 240 pixel resolution (QVGA).
- High contrast display.
- Day and Night mode colour palettes.
- Fully waterproof to IPX6 standard.
- Stylish low-profile flush mount or surface mount with supplied adaptor.
- Same footprint as ST60+ instruments.
- Can easily be retrofitted to ST60 flush mount installations with A22113 panel adaptor.

SmartController
Monitor your Raymarine SeaTalk instruments with the wireless SmartController. Wireless operation means freedom to view vital information when on deck or out of sight of your instruments.

TECH**TIP**

PHOTO: NIMBUS BOATS

Speed
- VMG to Waypoint.
- VMG to Waypoint Log.
- Speed and Speed Log.
- Maximum Speed.
- Average Speed.
- VMG Windward.
- Log and Trip.
- Race and Local Time.
- Local Date.
- Stopwatch.

Depth
- Depth (feet, fathoms or metres).
- Depth log.
- Minimum depth.
- Maximum depth.

Compass
- Heading and Heading Log.
- Locked and Tack heading.
- CMG (Course made good).
- DMG (Distance made good).
- Average course error.
- Average heading.

Wind
- Apparent wind speed.
- Apparent wind angle.
- True wind speed.
- True wind angle.
- GWD (Ground Wind Direction).
- Beaufort scale.
- Cardinal.
- Wind speed log and wind direction log.
- Minimum and maximum apparent wind speed.
- Minimum and maximum true wind speed.

Engine Data
- Engine RPM.
- Fuel flow and fuel level.
- Battery voltage.
- Battery voltage log.
- Battery Amps and temperature.
- Engine hours.
- Trim position.
- Oil pressure.
- Oil temperature.

Engine Data continued...
- Coolant temperature and pressure.
- Boost pressure.

Environmental
- Sea temperature.
- Barometric pressure and barometric pressure log.
- Sunrise and sunset.
- Sea temperature (min and max).
- Air temperature and air temperature log.
- Air temperature (min and max).

Other data features*
- Navigation
- Fuel
- GPS
- Time
- Distance

*For more details, turn to page 63.

Transducers
ST70 uses the same transducers as the ST60+ range of instruments. However, SeaTalk^{NG} transducer pods are required to link the transducers to the ST70 network. Transducers and pods are sold separately.

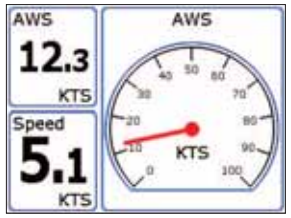
Compatible with existing ST60+ transducers (when used with an ST70 transducer pod) and new SmartTransducers.

Smart Transducers
The DST800 and DT800 Smart Transducers are supplied with SeaTalk^{NG} cables and connect directly into the SeaTalk^{NG} backbone, simplifying the installation and negating the need for a pod. The DST800 combines depth, speed and temperature transducers within the same 50mm housing. DT800 provides depth and temperature. Depth ceramic is set at 12 degrees.

Analogue Repeaters
Analogue repeaters (Wind, Compass and Rudder Angle) are available for use with ST70 and ST70 Plus instruments. For information, go to our website **www.raymarine.com**

PHOTO: BENETEAU GROUP

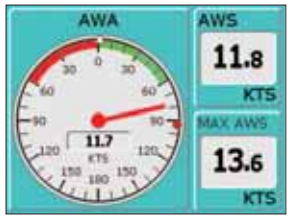
PHOTO: AZIMUT-BENETTI S.P.A



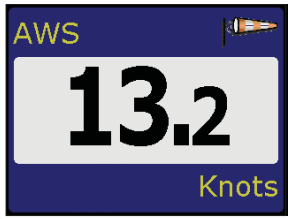
Average wind speed (day mode)

Boat Speed (day mode)

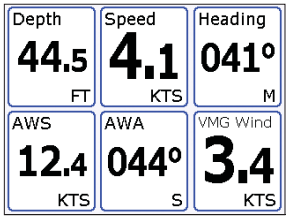
Apparent Wind Angle (day mode)



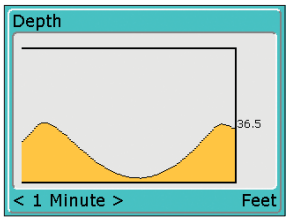
Wind Multi Screen (night mode)



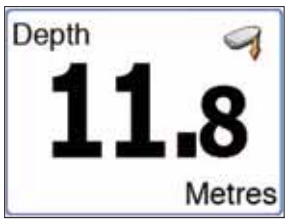
Average Wind Speed (night mode)



Multi Data Display (day mode)

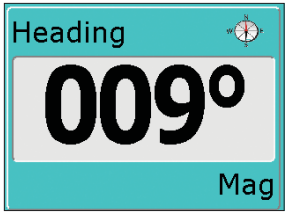


Depth Log (night mode)



Depth (day mode)

Average Wind Speed (night mode)



Heading Log (day mode)

SPECIFICATIONS

Absolute voltage range	9 – 16 volts DC
Power consumption	220mA (typical)
Product weight kg (lbs)	0.27 (0.6)
Mounting method	low profile flush or surface mount
Control type	4 buttons plus multi directional trackpad
Display	89 mm sunlight viewable (320x240 pixels) colour transflective TFT
Colour palettes	day and night modes
Display lighting	white LED, sliding scale
Connectors	2 SeaTalk^{NG} connectors
Interfaces	SeaTalk^{NG}, NMEA 2000, SeaTalk, SeaTalk^{2}
Languages	UK English, US English, Spanish, French, German, Dutch, Italian, Swedish, Danish, Norwegian
User instrument page options	8 (instrument head) 3 (autopilot head)
Page layout options	instrument:16; autopilot: display/compass rose/isometric

ORDERING INFORMATION

E22105	ST70 colour instrument display
E12196	ST70 colour autopilot display
A25062	SeaTalk^{NG} backbone interconnection kit
E22106	ST70 depth transducer pod
E22107	ST70 speed transducer pod
E22108	ST70 wind transducer pod
A06043	Spur to stripped end cable – 1m
A06044	Spur to stripped end cable – 3m
A06048	SeaTalk^{2} adaptor cable – 5 pin
A06061	E Series to SeaTalk^{NG} adaptor cable
A06062	SeaTalk^{2} to cable – female
A06031	SeaTalk^{NG} terminator
A22123	ST60+ to ST70 bracket adaptor
A22111	DST800-0 depth/speed/temperature
A22112	DT800-12 depth/temperature

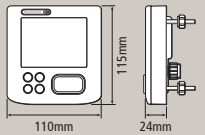


PHOTO: © JOE MCCARTHY

ST60+ INSTRUMENTS. THE CHOICE AROUND THE GLOBE

ST60+ offers everything from stand-alone display units to sophisticated, fully-integrated systems. Significantly enhanced displays ensure superior viewing angles for both day and night conditions. Simple, push-button controls make ST60+ instruments extremely easy to use.

- Bezels to match multifunction displays.
- Speed over ground (SOG) now available on Speed and Tridata.
- Automatic switching of depth sensors when used with depth sounder modules to eliminate interference.
- 'Soft' power down.

ST60+ Compass

- Dedicated easy-to-read analogue/digital display.
- Patented fluxgate transducer.

ST60+ Speed

- Displays speed through water, speed over ground (GPS required).
- Sea surface temperature, trip and log data.

ST60+ Tridata

- Combines depth and speed data in an easy-to-read 3-line display.
- Dedicated depth and speed displays with trip/log, sea temperature and SOG.

ST60+ Depth

- Easy-view large digits plus depth trend indicator.
- Min/max depth.
- Audible shallow, anchor and deep water alarms.

ST60+ Wind

- Combines analogue and digital measurements.
- Calculates both apparent and true (relative) wind speed/angle (true wind requires SeaTalk speed through water data).

ST60+ Rudder

- ST60+ analogue rudder display available with rudder transducer.
- Or used as a repeater for a Raymarine SeaTalk autopilot.

ST60+ Close Hauled Wind

- Magnified 20° – 60° display for when a single degree can make all the difference.

ST60+ Graphic Repeater

- Displays all ST60+ data on SeaTalk in graphic and multi-line formats.

Wind Transducers

Raymarine wind transducers offer low start-up speeds, smooth operation and great accuracy. There are two designs to choose from: aluminium short arm or carbon fibre long arm.

PHOTO: NB MARINE

TECHTIP

SmartController

Monitor your Raymarine SeaTalk instruments with the wireless SmartController. Wireless operation means freedom to view vital information when on deck or out of sight of your instruments.

GENERAL ST60+ SPECIFICATIONS

Nominal voltage	12V DC system
Absolute voltage range	10 – 16V DC
Power consumption	Speed, Depth, Rudder Angle and Tri-data 45mA, Compass, Wind and CH Wind 65mA, Graphic 50mA
Mounting methods	flush/surface/bracket
Control type(s)	4 backlit buttons
Display size	Speed, Depth and Tridata 92mm segmented LCD; Graphic 92mm dot matrix LCD; Compass, Wind and CH Wind 34mm segmented LCD & pointer
Display lighting	3 levels plus off
NMEA input and output (0183)	via E85001 (ST60+ Graphic)
SeaTalk	2 connections
PC (RS232) and RayTech interface option (via E85001)	Yes

ORDERING INFORMATION

A22004-P	ST60+ Tridata display – digital
A22013-P	ST60+ Tridata system – digital
A22017-P	ST60+ Tridata repeater – digital
A22002-P	ST60+ Depth display – digital
A22010-P	ST60+ Depth system w/transducer – digital
A22001-P	ST60+ Speed display – digital
A22009-P	ST60+ Speed system w/transducer – digital
A22005-P	ST60+ Wind display – analogue
A22011-P	ST60+ Wind system analogue rotavector – power
A22012-P	ST60+ Wind system analogue vane – power/sail
E22075-P	ST60+ Graphic display
A22006-P	ST60+ CH/VMG repeater display – analogue
A22007-P	ST60+ Compass display – analogue
A22014-P	ST60+ Compass system – analogue
A22008-P	ST60+ Rudder angle indicator display – analogue
A22015-P	ST60+ Rudder angle indicator system – analogue

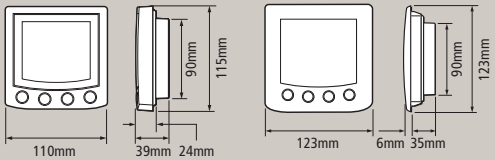


PHOTO: SUNSEEKER INTERNATIONAL LTD

PHOTO: BENETEAU GROUP

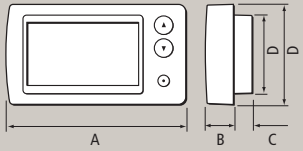
PHOTO: HAINES GROUP

GENERAL ST40 SPECIFICATIONS

Nominal voltage	12V DC system
Absolute voltage range	10 – 16V DC
Power consumption (mA)	Speed and Wind: 25, Compass 20; Depth 30; Bidata 35 (typical)
Mounting methods	surface or bracket
Control type(s)	3 backlit buttons
Display size and type	88mm segmented LCD
Maximum character size	Speed, Depth Bidata 28mm; Wind and Compass 17mm
Display lighting	3 levels plus off
NMEA input and output (0183)	option via E85001
SeaTalk connection	Yes
Low power indication	Yes
Adjustable display response	Yes
System option supplied with transducer	Yes

ORDERING INFORMATION

E22043	ST40 Speed through-hull system
E22044	ST40 Depth through-hull system
E22045	ST40 Bidata system
E22047	ST40 Wind system
E22048	ST40 Compass system
E22052	ST40 Speed transom mount system
E22053	ST40 Depth transom mount system
E22054	ST40 Bidata transom mount system
E22037	ST40 Speed display only
E22038	ST40 Depth display only
E22039	ST40 Bidata display only
E22041	ST40 Wind display only
E22042	ST40 Compass display only



A:126mm
B: 21mm
C: 17mm
D: 55mm
E: 70mm

ST40. THE BEST THINGS COME IN SMALL PACKAGES

Big displays for smaller powerboats, yachts and RIBs, these powerful SeaTalk instruments offer full integration with Raymarine autopilots and navigation equipment and can be surface or trunnion mounted.

Extra large (28mm max) digits and razor sharp LCDs – easy-to-use ST40 instruments have outstanding visibility in all lighting conditions.

ST40 Speed

Shows current, maximum and average boat speed, log, trip and sea temperature.

ST40 Bidata

Speed, depth, log and sea temperature. Two sets of data at once in large or small digits.

ST40 Compass

Displays current compass heading plus locked heading, has 'off course' alarms and can be used as a 'Man Over Board' repeater.

ST40 Depth

Crystal clear depth readout. Shallow and deep anchor alarms and minimum depth display.

ST40 Wind

Apparent wind speed and direction and true wind speed and direction. Talks to your autopilot to steer your boat to a saved apparent wind angle.

AUTOHELM AUTOPILOTS – YOUR EXPERIENCED EXTRA CREW MEMBER

It's a beautiful day, the sun's out and you fancy a break. Let the autopilot take the strain while you relax. The wind whips up, just hit the button while you shorten sail or head below to check everything's secure. It's blowing a gale, the waves are 30' high, and you're racing hundreds of miles from land…

From a basic tiller pilot to a powerful inboard system, each Raymarine autopilot comes with a simple, intuitive keypad and clear, functional LCD display.

So what is an Autopilot?
An autopilot connects to your steering system and continually corrects your boat's heading with information supplied by the compass, wind transducers or GPS/Plotter.

Autopilots are designed to maintain an accurate course in various sea conditions with minimal helm movements. They can act as a spare pair of hands or an extra crew member allowing you to trim the sails or get the fenders over the side. Because they steer so accurately, they will save fuel and get you to your destination faster, especially when connected to a chartplotter.

Autopilots consist of three main components: a heading sensor (usually a compass), a course computer/processor and control head (the brains), and a drive mechanism (the business end).

Autopilot Types
There are two types of autopilot, above deck and Inboard (also called below decks). Above deck pilots are simple to install and remain in the cockpit in all types of weather. Inboard autopilots are permanently mounted below decks and are more powerful, more reliable, steer your boat better and can be supplied with a range of autopilot controllers.

Raymarine autopilots work so well that it's sometimes easy to forget that they can't see – they can't automatically avoid obstacles or other vessels. Always keep a vigilant watch.

Raymarine SPX autopilots – the smart choice
From a tiller pilot or wheel-mounted Sportdrive to a full inboard system, Raymarine SPX autopilots are powerful but simple to use with a choice of clear , easy-to-read LCD displays.

X-tra – accurate steering.
X-tra – accurate tracking.
X-tra – energy efficient.
X-tra – fuel efficient.
X-tra – easy to install and service.

PHOTO: NIMBUS BOATS

PHOTO: NORDWEST

PHOTO: JEANNEAU (BENETEAU GROUP)

ST1000 & ST2000 TILLER PILOTS: REMOVABLE COCKPIT AUTOPILOTS FOR TILLER STEERED YACHTS

ST1000/ST2000

Invented by Autohelm in 1973, tiller pilots have consistently been the world's most popular pilot ever since, setting the standard for performance, reliability and ease of use. Advanced features are standard. AutoTack lets you handle the sheets while the pilot tacks the boat and AutoSeastate intelligently keeps the boat on course while conserving power.

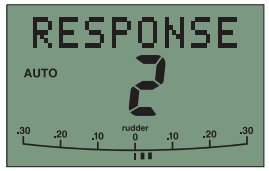
Whether used as a stand-alone pilot or with a SeaTalk/NMEA GPS, the clear backlit LCD and 6-button keypad make these pilots safe and easy to use.

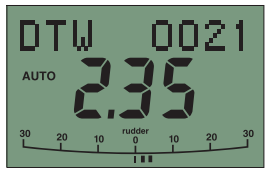
PHOTO: BENETEAU GROUP

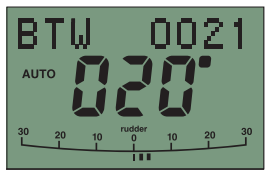
PHOTO: SUNBEAM YACHTS

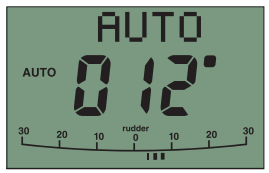
	Recommended Maximum Displacement*
ST1000	3,000kg (6,600lbs)
ST2000	4,500kg (10,000 lbs)

***Important displacement information**
Remember, always take the fully laden displacement weight of your vessel into account, this is often 20% above the designed displacement, so don't be tempted to choose a pilot which will always be working at the limits of its design capabilities. If you choose your pilot with safety in mind, it won't struggle when the going gets tough.









SPX-5/SPX-5GP REMOVABLE TILLER DRIVE AUTOPILOTS

The rugged SPX-5 and SPX-5 GP Tiller Pilots are perfect for large tiller steered yachts up to 6,000kg (13,200lbs) and 7,500kg (16,000lbs) displacement respectively.

You can steer straight to a waypoint, lock on to a given wind angle, or simply set and follow a course to steer by making the most of the full SeaTalk and NMEA compatibility. The fluxgate compass is separated from the drive unit for greater accuracy and you can mount the control unit wherever it will be within easy reach for you. Used by some of the world's top single-handed sailors, Raymarine tiller pilots meet the demands of the serious sailor. The SPX-5 Tiller Pilot is suitable for most cruising and racing scenarios, however, extended cruising or challenging racing conditions may benefit from the added ruggedness of the SPX-5 GP Tiller Pilot.

	Recommended Maximum Displacement*
SPX-5 Plus Tiller Pilot	6,000kg (13,200lbs)
SPX-5 GP Tiller Pilot	7,500kg (16,500 lbs)

Features

- Unique tiller pilot system with full function ST6002 control head and remote mounted fluxgate compass.
- The SPX-5 Tiller Pilot is supplied with the ST6002 Control Head. However, additional controls (ST7002 and ST8002) are available for second station installations as well as wireless remote controls.
- Powerful tiller drive unit is compact and unobtrusive.
- Smart Rudder Sense™ (SRS) enabled – Rudder Reference Transducer not required.

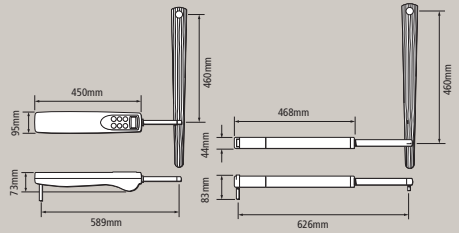
Installation. We recommend that you consult a Raymarine approved dealer who can specify, install and commission the correct Raymarine system for your boat. An approved installation also carries our full worldwide 2 year warranty.

TILLERPILOT SPECIFICATIONS

GENERIC	
Power supply	12V systems
Absolute voltage range	10 – 16V DC
Power consumption	ST1000/ST2000: 40mA SPX-5 Tiller: 250mA
ST1000/ST2000 SPECIFIC	
Weight kg (lbs)	1.53 (3.4)
Mounting methods	reversible port or starboard
Display size	45mm segmented LCD
Display lighting	3 levels plus off
Connections	NMEA 0183 input SeaTalk
Thrust	ST1000: 57kg (125lbs) ST2000 77kg (169lbs)
Stroke	236mm (9.3in)
SPX-5 TILLERPILOT SPECIFIC	
Thrust	84kg (185lbs)
Stroke	254mm (10")
Connections	NMEA 0183 input / output (x1); SeaTalk (x2); SeaTalk^{NG} (x1)

ORDERING INFORMATION

A12004	ST1000 Tillerpilot
A12005	ST2000 Tillerpilot
E12203	SPX-5 Tiller drive
E12204	SPX-5 Tiller drive GP
E12137	SPX-5 Tiller drive – no control head
E12138	SPX-5 Tiller drive GP – no control head



SPX-5 WHEEL DRIVE FIXED PILOT FOR SAILBOATS

The SPX-5 wheel pilot comprises a fully enclosed wheel-drive for simple installation and superb autopilot performance. Mount the separate control unit where it is easy to reach and see. The course computer and fluxgate compass are mounted separately for optimum performance.

The rugged wheel-drive unit is available as an upgrade for existing ST4000 systems.

Display Head Options

The SPX-5 Wheel Pilot is supplied with the ST6002 Control Head. However, additional controls (ST7002 and ST8002) are available for second station installations as well as wireless remote controls. You can opt for the full colour ST70 autopilot control head.

Installation

We recommend that you consult a Raymarine approved dealer who can specify, install and commission the correct Raymarine system for your boat.

An approved installation also carries our full worldwide 2 year warranty.

Features

- Quick and easy installation.
- Fits most types of wheel.
- Independent display for 'best location'.
- Simple robust clutch engagement mechanism.
- Clean design.
- Smart Rudder Sense™ (SRS) enabled – Rudder Reference Transducer not required.

PHOTO: X-YACHTS

***Important displacement information**
Remember, always take the fully laden displacement weight of your vessel into account, this is often 20% above the designed displacement, so don't be tempted to choose a pilot which will always be working at the limits of its design capabilities. If you choose your pilot with safety in mind, it won't struggle when the going gets tough.

	Recommended Maximum Displacement*
SPX-5 Wheel Pilot	7,500kg (16,500 lbs)

PHOTO: NIMBUS BOATS

SPX-5 SPORT DRIVE FIXED PILOT

The SPX-5 Sport Wheel Drive Pilot is a helm mounted autopilot designed for use on small sports and fishing boats typically up to 9.2m (30') in length. Suitable for use with fixed and tilt helms, the pilot consists of a drive unit that fits over your existing steering wheel shaft, a course computer with a rate gyro for precise course keeping and control head with large LCD information display.

Operation couldn't be simpler… steer onto your desired course, press the large red AUTO button (black on optional ST70 control head) and let go of the wheel! It really is that simple. To disengage the pilot and regain manual control, grab hold of the wheel and press the STANDBY button, you now have control. When part of a SeaTalk navigation system, the Sport Drive can track to single waypoints or follow a route consisting of multiple waypoints.

Weights

- Mechanical steered boats – up to 4,400lbs.
- Hydraulic steered boats – up to 7,000lbs.

Features

- Install the drive unit directly on to your existing steering wheel (tapered steering shaft behind the wheel).
- Smart Rudder Sense™ (SRS) enabled - Rudder Reference Transducer not required.
- Easy to install and simple to calibrate thanks to the intelligent Autolearn software that automatically learns your boat's handling characteristics.
- Rate gyro built into the course computer ensures precise course keeping.
- Ideal for trolling speed applications.

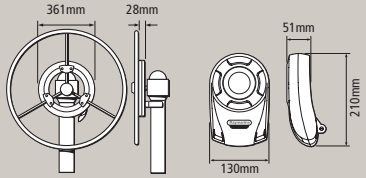
Optional ST70 control head available for wheel and Sport Drive autopilots.

SPX WHEEL PILOT SPECIFICATIONS

GENERAL	
Power supply	12V systems
Absolute voltage range	10 – 16V DC
Power consumption	250mA (Standby mode)
Thrust	30Nm
Connections	x2 SeaTalk x1 SeaTalk^{NG} 1x NMEA 0183 input / output
SPX-5 WHEEL PILOT	
Maximum recommended laden boat displacement	7500kg (16,500lbs)
Revs per minute (rpm)	9
SPX-5 SPORT DRIVE PILOT	
Maximum torque	15Nm
Maximum recommended laden boat displacement	mechanical: 2000kg (4400lbs) hydraulic: 3200kg (7000lbs)

ORDERING INFORMATION

E12201	SPX-5 SmartPilot wheel
E12133	SPX-5 SmartPilot wheel – no control head
E12206	SPX-5 Sport Drive Pilot
E12132	SPX-5 Sport Drive Pilot - no control head



Sport Drive Selection Chart

	Displacement up to 4400 lbs	Displacement up to 7000 lbs	Typical Boat Length
RIBs (Mechanical)	●		>7.7m (25ft)
RIBs (Hydraulic)		●	>9.0m (30ft)
Outboard (Mechanical)	●		>7.7m (25ft)
Outboard (Hydraulic)		●	>9.0m (30ft)
Power Assisted		●	>10.7m (35ft)

Mechanical Constraints Information

	Mechanical Restraints	
Wheel Taper Sizes	19mm (3.4")	25mm (1")
Max. Wheel Diameter	460mm (18")	
Max. Wheel Weight	1.8kg (3.96lb) mass with no one-handed wheel knobs	
Max. Wheel Torque	15Nm (11Ft lbs)	
Wheel Lock to Lock	2.5 to 5 turns	

SMARTPILOT INBOARD AUTOPILOT SYSTEMS

Next to choosing the boat itself, choosing the right autopilot can be one of the most important decisions a boat owner has to make. With a vast array of autopilot models and configurations to choose from, selecting the right autopilot can seem like a daunting task. The following pages are designed to help you choose the right Raymarine SmartPilot, system for your boat.

An inboard autopilot system consists of three elements:

Autopilot Control Head
This is the display unit you use to control your autopilot system. Raymarine offers a number of options, including multiple control heads, as well as full-function remotes and joystick controls.

Course Computer
The course computer is the central intelligence hub of the autopilot system, linking the autopilot control head to the drive unit.

Every SPX system – from the largest SPX-30 to the entry-level SPX-5 – comes with a rate gyro to provide the best possible performance.

SPX uses Advanced Steering Technology (AST), which intelligently monitors the yaw of the vessel and actually anticipates course changes as well as ensuring razor-sharp course keeping.

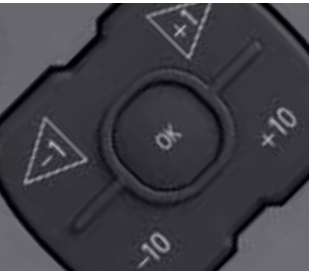
SPX features Raymarine's proven AutoLearn function, so the pilot automatically understands the vessel's steering characteristics, simplifying calibration and allowing the vessel to constantly adapt to changing sea conditions.

Smart Rudder Sense™
SPX is enabled with Smart Rudder Sense™ technology allowing precise steering without the use of a rudder feedback sensor. This innovative feature is ideal for outboard engines and installations that can not fit a rudder sensor.

Drive Unit
The drive unit is the part that interfaces with your vessel's steering system to keep you on the right course. Raymarine has a broad range of drive units to match almost any type of steering system.

Over the next few pages, we'll explain the factors to consider when choosing each of these parts of your system.

PHOTO: VIKSUND BÅT AS



Step 1.0: Drive Unit Selection

Know your boat and your steering system

The first step in selecting a Raymarine autopilot is to choose the proper autopilot drive unit for your vessel. Raymarine autopilot drive units are available in an array of sizes and configurations to accommodate various steering types and vessel displacements.

What type of steering system do you have?

To select an autopilot correctly, you will need to find out what type of steering system is installed on your vessel. This may involve opening a few hatches and looking at the gear, or this can be a simple case of consulting your boat dealer or steering manufacturer.

Raymarine SmartPilot systems accommodate hydraulic, mechanical and power assisted stern drive systems. If you are not sure how to determine what type of steering system is installed on your vessel, please consult an authorised Raymarine dealer. Raymarine dealers are well-skilled and have been Raymarine trained to evaluate and assist you in selecting the right autopilot for your boat.

Step 1.1: Hydraulic Steering Systems

Raymarine SmartPilots connect to hydraulic steering systems using a rugged hydraulic pump matched to the capacity of the hydraulic steering system. To match a Raymarine SmartPilot hydraulic pump to your vessel you need to know the size (in cc) of the hydraulic cylinder ram(s) that is mounted to the rudder on inboard engined boats, or mounted to the drive unit on outboard engined boats. Your steering system documentation will have this information. Alternatively, you can look on the cylinder ram itself for the brand and model number. Once you know the model number, visit our website (**www.raymarine.com**) and access our hydraulic cylinder ram cross-reference guide to determine which hydraulic autopilot pump is compatible with your vessel's hydraulic steering system.

Raymarine autopilot hydraulic pumps are available in several sizes to accommodate the broad range of steering cylinder capacities. The table below shows the capacity of each Raymarine hydraulic autopilot pump when used with the corresponding SmartPilot course computers.

	HYDRAULIC STEERING SYSTEMS			
DRIVE TYPE	**TYPE 0.5**	**TYPE 1**	**TYPE 2**	**TYPE 3**
Vessel displacement	Not applicable for hydraulic steering as the drive unit is matched to the ram capacity of the steering system			
Ram capacity	50–110cc	80–230cc	230–350cc	350–500cc
Maximum stall pressure at 12V	50 bar	50 bar	100 bar	80 bar
Peak flow rate (no load)	650 cc/min	1000cc/min	2000cc/min	2900cc/min
Course computer used	**SPX-10**	**SPX-10**	**SPX-30**	**SPX-30**

- In some systems with dual steering rams in parallel, cylinder capacity is the total of both rams. Rams in series only require single capacity valve. Hydraulic steering systems with steering rams over 500cc require our larger constant running hydraulic pump used in conjunction with SPX and SPX-SOL course computers – contact Raymarine for details.
- An authorised Raymarine dealer is best suited to installing a hydraulic autopilot system.
- Type 0.5 suitable for Volvo D4 / D6 Sterndrive applications.

Installation

We recommend that you consult a Raymarine approved dealer who can specify, install and commission the correct Raymarine system for your boat. An approved installation also carries our full worldwide 2 year warranty.

Constant running pump

For information on the Constant Running Pump usage, please contact the Raymarine product support department.

ORDERING INFORMATION

M81120	Type 1 (12V)
M81119	Type 1 (24V)
M81121	Type 2 (12V)
M81123	Type 2 (24V)
M81122	Type 3 (12V)
M81124	Type 3 (24V)
E12139	0.5 Litre pump
E12171	Constant running pump (12V)
E12172	Constant running pump (24V)

Step 1.2: Mechanical steering systems

When selecting an autopilot drive unit for a mechanical steering system, the vessel displacement is the determining factor for selecting the correct drive. **When determining your vessel displacement, always add 20% to the displacement of your vessel to account for the added weight of fuel, gear, provisions and people.** Raymarine SmartPilot drive units for mechanical steering systems are available in linear, hydraulic linear and rotary configurations.

Hydraulic linear drives

Designed for larger mechanically steered vessels over 20,000 kg, our hydraulic linear drives are self-contained hydraulic steering systems consisting of a reversing pump, reservoir and hydraulic ram.

	HYDRAULIC LINEAR DRIVES	
Drive Type	**TYPE 2**	**TYPE 3**
Maximum boat displacement	22,000 kg	35,000 kg
Peak thrust	585 kg	1,200 kg
Maximum stroke	254 mm	300 mm
Hard-over to hard-over times	10 seconds	10 seconds
Maximum rudder torque	1,270 mm	3,200 mm
Corepack used	**SPX-30**	**SPX-30**

- A hydraulic linear drive unit connects to the rudder stock via an independent tiller arm. Accessory fittings from your steering system manufacturer may be required.
- An authorised Raymarine dealer is best suited for installing a linear drive system.
- Must be able to back drive steering system for the rudder.

Universal stern drive

The universal stern drive is for use with inboard/outboard (I/O) vessels with power assisted steering.

	UNIVERSAL STERN DRIVE
Maximum boat displacement	Does not apply
Drive method	Electromechanical
Maximum thrust	50kg
Recommended hard-over times	8.8 seconds
Maximum stroke	214mm
Corepack used	**SPX-10**

- **Always verify compatibility before installing a drive unit by consulting an authorised Raymarine dealer or Raymarine's Customer Support team.**
- The drive is compatible with 1997 or later Mercruiser power assist inboard/outboard drives and Volvo Penta.
- Vessels with 12V systems only.
- An authorised Raymarine dealer is best suited for installing a linear drive system.
- Compatible with Volvo Penta and Mercruiser I/O drive engines – see dealer for bracket options with standard I/O drive.

Mechanical linear drives

Our most commonly used drive types for sailing vessels. Raymarine mechanical linear drives provide powerful thrust, fast hard-over times and quiet operation. Mounted below decks, the linear drive moves the rudder directly by pushing the tiller arm or a rudder quadrant.

	MECHANICAL LINEAR DRIVES		
DRIVE TYPE	**TYPE 1**	**TYPE 2 SHORT**	**TYPE 2 LONG**
Maximum boat displacement	11,000 kg (24,000 lb)	15,000 kg (33,000 lb)	20,000 kg (44,000 lb)
Peak thrust	295 kg (650 lb)	480 kg (1,050 lb)	480 kg (1,050 lb)
Maximum stroke	300 mm (12")	300 mm (12")	400 mm (16")
Hard over to hard over times (+/- 35°, no load)	11 seconds	11 seconds	14 seconds
Maximum rudder torque	735 nm (6,500 lb.in)	1,190 nm (10,500 lb.in)	1,660 nm (14,700 lb.in)
Power consumption	18–36 W	48–72 W	48–72 W
Corepack used	**SPX-10**	**SPX-30**	**SPX-30**

- A linear drive unit connects to the rudder stock via an independent tiller arm. Accessory fittings from your steering system manufacturer may be required.
- An authorised Raymarine dealer is best suited for installing a linear drive system.
- Must be able to back-drive steering system from the rudder.

Mechanical rotary drives

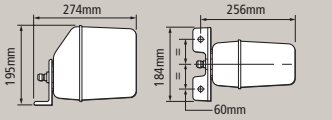
The rotary drive is designed for power and sailboat systems that can be driven from the helm position through a chain and sprocket (e.g. cable and rod steering systems). The outstanding design of the Raymarine rotary drive unit provides smooth, powerful autopilot controlled steering with quiet operation. Use the table below to select a rotary drive suitable for your vessel displacement.

	MECHANICAL ROTARY DRIVES	
DRIVE TYPE	**TYPE 1**	**TYPE 2**
Maximum boat displacement	11,000 kg	20,000 kg
Peak output torque	20 nm	34 nm
Maximum shaft speed	33 rpm	33 rpm
Recommended hard-over times (no load)	10 seconds	10 seconds
Power consumption	24–48 W	60–84 W
Corepack used	**SPX-10**	**SPX-30**

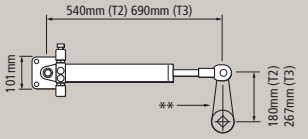
- Optional drive sprockets and modification to the steering chain may be required.
- An authorised Raymarine dealer is best suited for installing a linear drive system.

MECHANICAL DRIVE UNITS

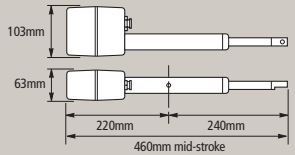
ORDERING INFORMATION	
M81135	Type 1 12V Rotary Drive
M81136	Type 2 12V Rotary Drive
M81137	Type 2 24V Rotary Drive
M81138	Standard Sterndrive
E12026	Universal Sterndrive
M81130	Type 1 Linear Drive 12V
M81131	Type 2S (Short) 12V
M81132	Type 2L Linear Drive (Long) 12V
M81133	Type 2S Linear Drive (Short) 24V
M81134	Type 2L Linear Drive (Long) 24V
M81200	Type 2 Hydraulic Linear (12V)
M81201	Type 2 Hydraulic Linear (24V)
M81202	Type 3 Hydraulic Linear (12V)
M81203	Type 3 Hydraulic Linear (24V)



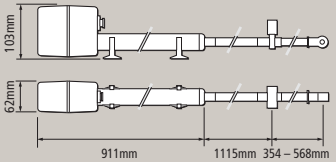
Rotary Drive



Hydraulic Linear Drive



Standard Sterndrive



Universal Sterndrive

Step 2: Your Course Computer

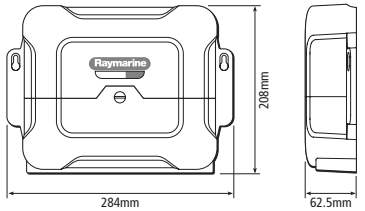
Having selected the correct drive unit, this defines which corepack, including the course computer is suitable for your boat. SmartPilot course computers use Raymarine's Advanced Steering Technology (AST).

	SPX COURSE COMPUTERS				
CORE PACKS	**SPX-5**	**SPX-10**	**SPX-30**	**SPX-SOL**	**SPX-CAN**
Compatible drive types	Sp/Wh/Ti	1	1/2/3	Solenoid	Volvo Penta IPS
Supply voltage – volts	12	12/24	12/24	12/24	12/24
Absolute voltage range – volts DC	10.5 – 16	10.5 – 32	10.5 – 32	10.5 – 32	10.5 – 32
Motor drive current (continuous peak) – Amps	5 (10)	10 (25)	30 (50)	–	–
Weight kg (lbs)	2.2 (4.85)	2.2 (4.85)	2.2 (4.85)	2.2 (4.85)	2.2 (4.85)
Mounting method	Bulkhead	Bulkhead	Bulkhead	Bulkhead	Bulkhead
Clutch current – Amps		1.2	3	3	
SeaTalk current	2	2	3	3	3
NMEA 0183/2000	o	o	o	o	o
Fishing Patterns (via ST70/ST70+ autopilot head)	o	o	o	o	o
Built-in rate gyro	o	o	o	o	o
Advanced steering technology (AST) with AutoLearn	o	o	o	o	o
Rudder reference less	o	o	o*		
Fast heading data output: NMEA 0183 – 5Kz, SeaTalk^{NG} – 10Hz	5/10 Hz	5/10 Hz	5/10 Hz	5/10 Hz	5/10 Hz
External compass standard in corepack	o	o	o	o	o
Fluxgate compass, rudder position sensor inputs	o	o	o	o	o
NMEA 0183, SeaTalk, SeaTalk^{NG} and power sleep switch inputs	o	o	o	o	o
CAN command acknowledge input					o
NMEA 0183, SeaTalk and SeaTalk^{NG} outputs	o	o	o	o	o
Driver motor output	o	o	o		
Drive clutch/Bypass valve outputs		o	o	o	
Bypass valve and solenoid drive outputs				o	
Remote control option	o	o	o	o	o
Multiple control displays	o	o	o	o	o
External alarm via E85001	o	o	o	o	o
Part number	**R18151**	**E12198**	**E12199**	**E12205**	**E12200**

Sp = Sport drive Wh = Wheel drive Ti = Tiller drive

* Supplied with rudder reference transducer for enhanced performance.

PHOTO: © JOE MCCARTHY



More powerful and rugged than ever before, SmartPilot course computers serve as the central intelligence hub of our inboard pilot systems.

PHOTO: © JOE MCCARTHY

SPX with Advanced Steering Technology (AST)

SPX pilots built-in Rate Gyro brings autopilot performance to a new level. The Rate Gyro enables Raymarine's Advanced Steering Technology (AST) software to intelligently monitor the yaw of the vessel and actually anticipates course changes. A specially developed course control algorithm then delivers razor sharp course keeping without instability or overshoot. This gyro enhanced autopilot performance and advanced software is especially valuable in difficult steering situations, such as downwind with a following sea. Raymarine's AST software also enables SPX pilots to 'AutoLearn' the vessels steering characteristics, simplifying calibration and allowing the autopilot to constantly 'adapt' to changing sea conditions.

SPX Autopilots. Easy to install and service, fuel efficient, energy efficient, accurate tracking and accurate steering.

SMARTPILOT SPX

What's in the box...

- SmartPilot SPX course computer.
- Fluxgate compass.
- Cabling.
- SPX-30 and SPX-SOL pilots include Rudder Reference Transducer.

Fishing patterns when used with ST70 control head (go to page 88)

MARPA and Radar/Chart Overlay. SPX course computers also provide accurate and stable heading data for MARPA and chart overlay functions on Raymarine's multifunction displays.

Control the way the pilot steers your boat. Using sensitive response AST for the most comfortable ride or to conserve power on long sail passages.

Set your pilot up for optimum performance. Using the intelligent AutoLearn function with new control units, AST* and AutoLearn* software to automatically learn your boat's handling characteristics.

Dodge function. Use the dodge function to return to a heading or track after a dodge manoeuvre.

Make crosstrack error a thing of the past. Use your inboard autopilot with a Raymarine GPS to track straight to your next waypoint.

Stay right on course when the going gets tough. Using Fastrim AST to correct any changes in standing helm to keep the vessel on course (e.g. weather helm or loss of one engine).

Course computer features

- Dodge function with ST70 Autopilot Control Head – view your choices with ST70.
- SeaTalk networking – SeaTalk and SeaTalk*NG*.
- Speed connectors for wiring.
- Simple installation – fixes with two screws.
- Connects to ST6002/ST7002/ST8002 control heads, ST290 keypads, wireless remote controls and ST70 Autopilot control head.
- Easy access enclosure.
- Current limiting protection.
- Switchable NMEA2000 and clutch power.
- Professional fishing patterns.

Step 3: Choosing your control head

The final step to building a Raymarine SmartPilot system is selection of an autopilot control head. Here the decision is a matter of personal choice since each fixed-mount SmartPilot Control Head will offer the same level of autopilot performance. Adding additional control heads is easy thanks to Raymarine's SeaTalk networking.

	CONTROL HEADS					
	ST6002	**ST7002**	**ST8002**	**ST70**	**S100***	**WIRELESS SMART CONTROLLER***
Button control	o	o		o	o	o
Button and rotary control			o			
LCD size (mm)	81	98	98	95	36	43
Character size (mm)	18	30	30	Variable	8	16
Customisable SeaTalk data pages	15	15	15	3 Boxes		8
Power steer mode			o			
AST and AutoLearn	o	o	o	o	AST Only	
Optional second or multi-station control heads	o	o	o	o	o	o
Surface or flush mount options	o	o	o	o		
Cradle or belt clip mount					o	o
Full calibration	o	o	o	o		
Nominal voltage (system)	12V	12V	12V	12V	12V	12V
Absolute voltage range	10 – 16V	10 – 16V	10 – 16V	9 – 16V	10 – 16V	10 – 16V
Current consumption (full lighting)	200mA	120mA	120mA	220mA		
Current consumption in standby mode	60mA	50mA	50mA			
Display lighting levels	3 + off	3 + off	3 + off	variable	on/off	
Weight kg (lbs)	0.36 (0.8)	0.45 (1.0)	0.45 (1.0)	0.27 (0.6)	0.06 (0.13)	0.16 (0.35)
NMEA 0183 input/output connections	o	o	o	o	Base station via E85001	
SeaTalk connectivity	o	o	o	o	1 via base station	
SeaTalk^{NG}, SeaTalk^{2} and NMEA 2000n connectivity				o		

* Must have a fixed head for calibration purposes.

ST6002 Control head

The ST6002 Control Head is perfect when space is limited, its clear LCD display with up to 15 SeaTalk data pages allows you to monitor important navigational data as well as control the autopilot.

- Compact and stylish control head matches Raymarine ST60+ as well as multifunction displays.
- Easy to read high-contrast display.
- Simple setup and calibration with AutoLearn.
- A versatile data repeater with 15 configurable instrument/navigation data pages.
- Intuitive Autohelm pilot controls.
- Rudder angle indicator.
- Programmable AutoTack control.
- Surface mount (standard) or optional flush-mount fascia.
- Compatible with all SmartPilot corepacks and drive units.
- Available in convenient preconfigured SmartPilot system packs (with corepack and drive unit) for sail and power applications.

ST7002 Control head

A powerful and versatile large control unit, the ST7002 is really simple to use. Its large informative display and intuitive keypad provide quick and easy access to all autopilot information as well as up to 15 pages of selectable instrument and navigation data pages. Ideal for longer passages, the response function controls the way the pilot helms the boat, ensuring the most comfortable ride at all times while keeping you right on course.

- Large crisp LCD display with easy-to-read rudder angle indicator.
- Simple setup and calibration with AutoLearn.
- A versatile data repeater with 15 configurable instrument/navigation data pages.
- Remote ST60+ instrument control feature allows control of ST60+ instrument displays from the ST7002 keypad.
- Intuitive keypad and the proven Autohelm button control.
- Programmable AutoTack control.
- Surface mount (standard) or optional flush-mount fascia.
- Compatible with all SmartPilot corepacks and drive units.
- Dedicated controls for response, resume and set course.

ST70 Control head

ST70 offers a new way of visualising instrumentation and autopilot control via a single high-resolution display.

- Simple start-up wizard quickly configures the autopilot.
- Compatible with SPX course computers
- Choose from digital display, compass rose or 3D isometric screens.
- Capable of displaying an additional 3 boxes of instrument data.
- Multilingual.
- New simplified set-up and calibration configuration.
- Surface or flush mount.
- Power on/off switch.
- Can be used as a master display or a colour repeater to an existing system.
- Intuitive dodge function, when connected to an SPX course computer, and extensive fishing patterns.

ST8002 Control head

Simply dial in your destination and press AUTO. The ST8002 puts total helm control at your finger tips with an easy-to-use rotary control for precise course changes and power-steering control. The large LCD displays large high-contrast characters of pilot status, compass heading and user defined pages, transforming the ST8002 into a versatile navigation instrument repeater display.

- Large crisp LCD display with easy-to-read rudder angle indicator.
- Simple setup and calibration with AutoLearn.
- A versatile data repeater with 15 configurable instrument/ navigation data pages.
- Compatible with all SmartPilot corepacks and drive units.
- Power Steer mode.
- Return rudder to midships by pressing the rotary control knob.

ST70 Fishing patterns

PHOTO: WINDY BOATS AS

ST70+ and Pilot Keypads

The ST70+ display is designed primarily for sail and powerboats over 12m (40') and is the perfect partner for Raymarine multifunction displays.

ST70+ is fully customisable, allowing you to view information when you want it and where you want it, be it in digital or analogue format, full screen or in user defined windows.

The button-less displays are operated by dedicated keypads – there's a push-button only pilot keypad for sailboats and a rotary for powerboats.

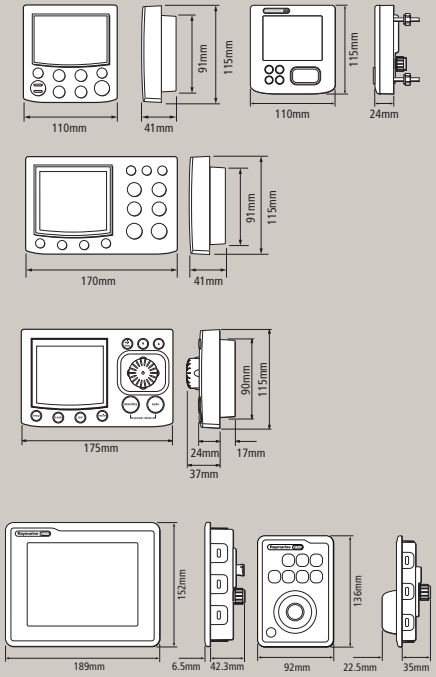
- Simple start-up wizard quickly configures the autopilot.
- Compatible with SPX course computers.
- Choose from digital display, compass rose or 3D isometric screens.
- Capable of displaying an additional 3 boxes of instrument data.
- Multilingual.
- New simplified set-up and calibration configuration.
- Surface or flush mount.
- Can be used as a master display or a colour repeater to an existing system.
- Intuitive dodge function, when connected to an SPX course computer, and extensive fishing patterns.

SPECIFICATIONS

Control head specifications can be found in the selection table on page 86.

ORDERING INFORMATION

E12098-P	ST6002 control head (surface mount)
E12100-P	ST6002 control head (flush mount)
E12099-P	ST7002 control head, (surface mount)
E12182	ST7002 control head, (flush mount)
E12119-P	ST8002 rotary control head, (surface mount)
E12183	ST8002 rotary control head, (flush mount)
E12196	ST70 colour control head
E22115	ST70+ multifunction display
E22117	ST70+ sail pilot keypad
E22118	ST70+ power pilot keypad
E12136	SeaTalk joystick



Joystick

Compatible with any Raymarine SmartPilot below-deck autopilot system, the SmartPilot Autopilot Joystick provides you with convenient auxiliary steering control anywhere on your boat using your autopilot's drive system. Multiple Joystick Controllers can be fitted anywhere you need to steer. Mount them at bridge-wing control stations, aft-decks or even in the arm of your Captain's chair. Easy SeaTalk network integration simplifies installation. The Raymarine SmartPilot Joystick Controller supports both proportional and bang-bang operation. Combine the Joystick Controller with an optional rudder angle instrument below for convenient full-function steering anywhere.

PHOTO: © JOE MCCARTHY

SPX-SOL SOLENOID INBOARD PILOT

The Raymarine SPX-SOL autopilot is compatible with solenoid drive systems and, like other SPX autopilots, offers performance enhancements with built-in AST (Advanced Steering Technology) and AutoLearn software.

When used with an ST70 Autopilot head, the SPX-SOL autopilot also gives you access to a wide range of fishing patterns.

Features

Compatible with:

- Solenoid drive systems.
- Raymarine Constant Running Hydraulic Pumps (12 volt from 3.0 to 4.5L and 24 volt from 3.0 to 4.5L).
- Drives 12V or 24V by-pass valve, up to 2A current draw.
- Designed to drive 12V or 24V solenoid valves, up to 5A current draw.

SPX-CAN AUTOPILOT FOR STEER-BY-WIRE PROPULSION SYSTEMS

Designed to integrate with the innovative steer-by-wire CAN based system (CAN driven and Volvo Penta IPS) the Raymarine SPX-CAN represents the convergence of autopilot and propulsion technology. Employing Raymarine's proven AST (Advanced Steering Technology), the SPX CAN delivers razor sharp course keeping and smooth course turns, in conjunction with the SPX-CAN 'steer by wire' propulsion system. CAN Bus communication protocols, provides the SPX-CAN with single cable interface to steer-by-wire. Raymarine's proven SeaTalk technology provides boat owners with their choice of multiple SmartPilot control heads as well as seamless integration with Raymarine's multifunction displays and instrument systems.

- Steer-By-Wire technology.
- Simplified CAN Bus autopilot interface.
- Advanced Steering Technology (Smartpilot AST).
- Compatible with Volvo Penta joystick controlled Sterndrives.

Note: Volvo Penta pilot interface required.

S1000 INBOARD AUTOPILOT WITH WIRELESS REMOTE CONTROL

PHOTO: © JOE MCCARTHY

Do you…

- Need an 'extra pair of hands'?
- Want to reduce fatigue on long journeys out to a favourite fishing spot?
- Want better fuel economy and shorter routes to waypoints?
- Have a powerboat typically 7.7m (25') or under with a balanced hydraulic system?
- Have a Seastar hydraulic system?

Yes? Then this is the autopilot for you

The S1000 'all-in-the-box' autopilot is for powerboats with balanced hydraulic systems (see **www.raymarine.com** for steering system compatibility). Complete with everything needed for easy installation, the S1000 is quick to fit and simple to use. No added complications from electronic compass or rudder reference transducers – the S1000 doesn't need them.

Control the S1000 autopilot with the S100 wireless remote; simply steer on to your desired heading, press PILOT to engage the pilot in to auto and off you go. To adjust your heading at any time, simply press the port/starboard arrow keys until the heading you want is displayed. To disengage the pilot, press STANDBY – that's all there is to it!

S1000 Features

- A 'back to basics' point and shoot autopilot.
- Designed for balanced hydraulic systems.
- No electronic compass or rudder reference transducer needed.
- NMEA input from handheld or fixed GPS/Navigator/Plotter.
- Built-in fishing patterns include cloverleaf, zig-zag and circle.
- Troll at speeds as low as 1 knot (subject to environmental conditions).
- Can be linked to kicker motor.
- SeaTalk GPS/Plotter compatible.

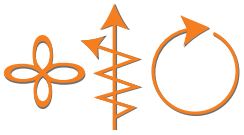
S100 Wireless Remote | RayStar125 GPS Antenna (optional extra) | Hydraulic pump (connected to steering hydraulic system) | Raymarine SeaTalk Network Connection | Control NMEA Connection | Power Supply

What's in the box…

- Installation video – watch before you fit.
- Wireless S100 handheld controller with lanyard, belt clip and 2 (two) storage cradles.
- Easy-install S1000 course computer.
- Hydraulic pump supplied pre-assembled with swaged hydraulic hoses.
- Bleed kit: oil, container, gloves, wrenches and connectors.

Fishing Patterns

The S1000 incorporates a number of dedicated fishing patterns. Patterns include: Cloverleaf, Zig Zag and Circle.

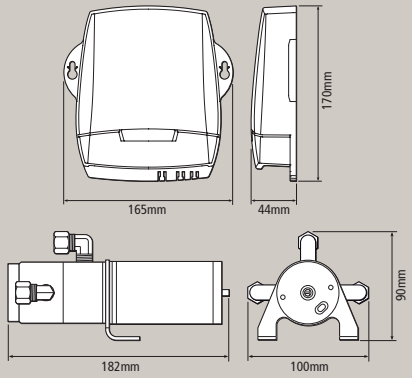


SPECIFICATIONS

Power supply	12V system
Absolute voltage range	10 – 16V DC
Mounting methods	surface
Weight kg (lbs)	0.4 (0.88)
NMEA 0183 inputs	1
NMEA 0183 outputs	1
SeaTalk connections	1
RF transmitter and receiver	Yes
Drive	S1000 pump
S1000 FIT GUIDE (TYPICAL	
Vessel type and size	up to 25'
Steering type	balanced hydraulic
Steering ram capacity	80 – 200cc
Peak flow and rate	800cc/min

ORDERING INFORMATION

E12169	S1000 Smartpilot wireless autopilot system



WIRELESS REMOTE CONTROLS

SmartController
Take full, onboard control of your Raymarine SeaTalk autopilot with the wireless SmartController. Wireless operation means freedom to monitor vital information when you're on deck or out of sight of your instruments.

Lightweight and compact for easy handling, the SmartController is a breeze to use thanks to its intuitive interface.

S100
The compact S100 gives you basic, onboard wireless control of any Raymarine SeaTalk autopilot, even if you're below deck and out of sight of your autopilot.

Easy operation and intuitive menu structure for easy access to all features. The S100 is powered by two AAA alkaline batteries.

	SMARTCONTROLLER	S100
User-definable pages – 1, 2 or 4 text lines and graphics	o	
2 line of text		o
Dot matrix LCD display (pixels)	64 x 127	24 x 127
Battery and signal strength indicator	Battery and Signal	Signal
Keylock security	o	
Backlit buttons	o	
Display local and system alarms	o	
Out of range of base station warning	o	o
Raised profile on Standby button for easy nightime identification	o	o
Wireless instrument repeater	o	
Wireless full-function autopilot controller*	o	
Plug and play – easy installation in minutes	o	o
Wireless range up to 10m (32') from base station	o	o
Wireless technology (IEEE 802.15.4)	o	o
Add handsets for additional users	o	o
Customise additional handsets for individual preferences	o	o
Add additional base stations for extended range	o	o

TECH**TIP** Both the SmartController and the S100 Wireless Remote are compatible with all Raymarine SeaTalk pilots.

REMOTE SPECIFICATIONS

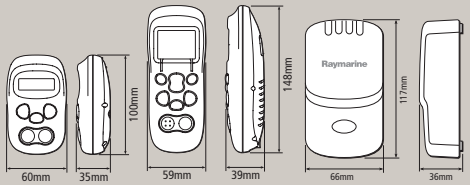
Power supply	12V systems
Absolute voltage range	10 – 16V DC
Battery	S100: 2 x AAA Smartcontroller: rechargeable NiMH
Weight kg (lbs)	S100: 0.06 (0.13) Smartcontroller:).16 (0.35)
Mounting methods	cradle or belt clip
Display size (mm)	S100: 9 x 35 Smartcontroller: 25 x 35
SeaTalk	via RF
RF transmitter and receiver	yes

BASE STATION SPECIFICATIONS

Power supply	12V systems
Absolute voltage range	10 – 16V DC
Weight kg (lbs)	0.1 (0.22)
NMEA 0183 input/output	via E85001
SeaTalk connection	1
RF transmitter and receiver	yes

ORDERING INFORMATION

E15024	S100 Wireless autopilot remote with base station
E15023	Smartcontroller wireless remote with base station



SEATALK^{NG}

Introduction

SeaTalk^{NG} is an interconnection bus for Raymarine products and comprises a main backbone to which Raymarine products are connected via spur cables.

SeaTalk^{NG} moves numerical data around the products connected to the SeaTalk^{NG} backbone.

Connectivity

Specific Raymarine products (e.g. ST70 instruments) perform a bridging function, to enable you to connect SeaTalk^{NG} to SeaTalk(1) products via appropriate adaptor cables. Adaptor cables are also available to connect NMEA2000 products.

Hardware

SeaTalk^{NG} comprises a single backbone terminated with two terminators, one at each end. Spur cables connect the backbone to individual SeaTalk^{NG} products.

Small diameter cable connectors are used throughout the system to make installation easier. Cables and connectors are colour-coded to reduce the likelihood of misconnection.

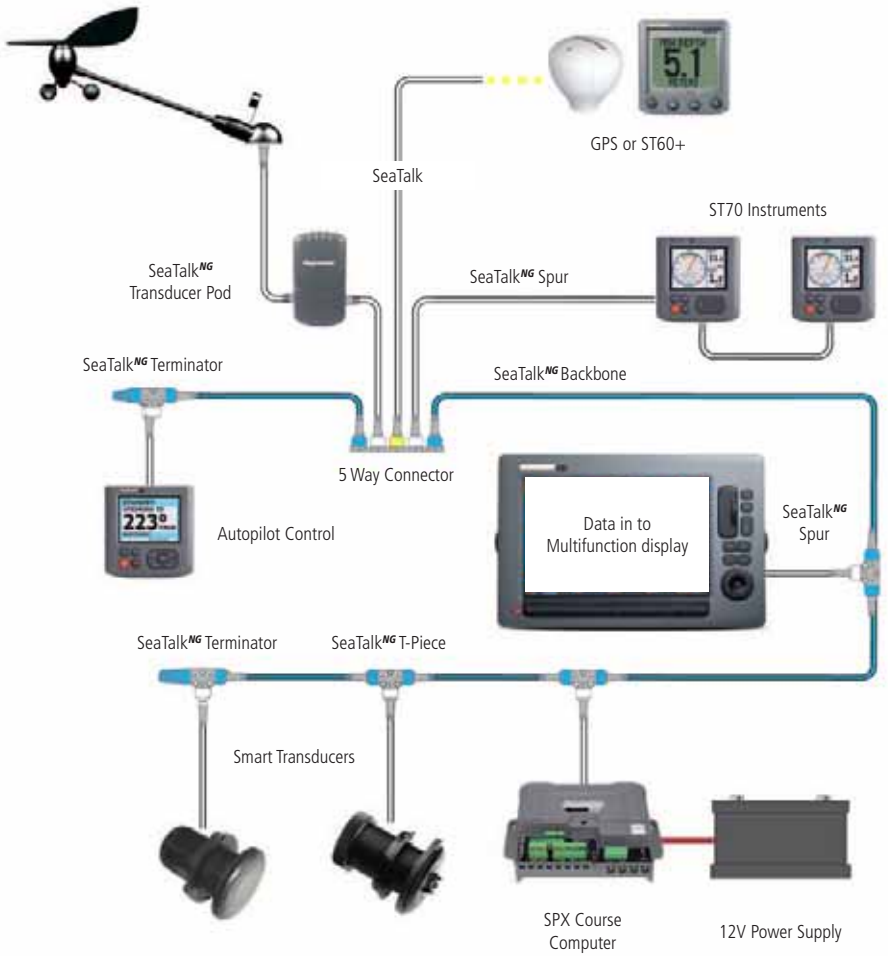
- Backbone is blue.
- Spurs are white.
- SeaTalk to SeaTalk^{NG} converter is yellow

A wide range of different cable lengths provides flexibility and obviates the need for cutting and splicing cables.

Three-way, five-way and in-line connection pieces are available to connect cables, to configure SeaTalk^{NG} as required.

A power cable is also provided and is colour-coded with a red strip.

Typical Basic SeaTalk^{NG} System



Important:

In order to ensure correct data transmission through a SeaTalk^{NG} system, a Terminator is required at each end of the backbone cable run. Dedicated Terminators are available for this purpose. Do NOT attempt to run a system that is not correctly terminated.

CABLES & ACCESSORIES

A SERIES	
A62154	A50/A57/A70 FLUSH MOUNT KIT
E32042	RAYSTAR 125
E66073	P74 TROLLING MOTOR TRANSDUCER IN HULL
A66090	B744V TRIDUCER A SERIES
E66087	B60 DEPTH TRANSDUCER W/20 DEGREE TILTED ELEMENT, A SERIES CONNECTION
E66088	B60 DEPTH TRANSDUCER W/12 DEGREE TILTED ELEMENT, A SERIES CONNECTION
A102140	P48 FANBEAM 200KHZ DT TM TRANSDUCER
R62158	A50 SUNCOVER
R62159	A57 SUNCOVER
R62160	A70 SUNCOVER

C SERIES WIDESCREEN	
E55049	SEATALK^{HS} NETWORK CABLE 1.5M
E55050	SEATALK^{HS} NETWORK CABLE 5M
E55051	SEATALK^{HS} NETWORK CABLE 10M
E55052	SEATALK^{HS} NETWORK CABLE 20M
E55053	SEATALK^{2}/NMEA2000 CABLE 1.5M
E55054	SEATALK/ALARM OUT CABLE 1.5M
E55055	VIDEO OUT CABLE 10M
E55056	VIDEO OUT CABLE 20M
E55057	VIDEO IN CABLE 1.5M
E55062	S-VIDEO CABLE 1.5M
A62245	SEATALK^{HS} DUAL END WEATHERPROOF NETWORK CABLE 1.5M
A62246	SEATALK^{HS} DUAL END WEATHERPROOF NETWORK CABLE 15M
E55058	SEATALK^{HS} NETWORK SWITCH
E55060	SEATALK^{HS} CROSSOVER COUPLER
E55061	SEATALK^{2} NAVIGATION KEYBOARD
A62132	C90W/E90W TRUNNION MOUNTING KIT
A62133	C120W/E120W TRUNNION MOUNTING KIT
A62134	C140W/E140W TRUNNION MOUNTING KIT
R62122	C90W/E90W SUN COVER
R62123	C120W/E120W SUN COVER
R62124	C140W/E140W SUN COVER
R62125	C90W/E90W FLUSHMOUNT KIT
R62126	C120W/E120W FLUSHMOUNT KIT
R62127	C140W/E140W FLUSHMOUNT KIT
E22158	IN LINE SEATALK^{1} TO SEATALK^{NG} INTERFACE BOX
E85001	PC/SEATALK/NMEA INTERFACE BOX

E SERIES WIDESCREEN	
E55049	SEATALK^{HS} NETWORK CABLE 1.5M
E55050	SEATALK^{HS} NETWORK CABLE 5M
E55051	SEATALK^{HS} NETWORK CABLE 10M
E55052	SEATALK^{HS} NETWORK CABLE 20M
E55053	SEATALK^{2}/NMEA2000 CABLE 1.5M
E55054	SEATALK/ALARM OUT CABLE 1.5M
A62158	E WIDESCREEN I/O VIDEO CABLE
E55055	VIDEO OUT CABLE 10M
E55056	VIDEO OUT CABLE 20M
E55057	VIDEO IN CABLE 1.5M
E55062	S-VIDEO CABLE 1.5M
A62245	SEATALK^{HS} DUAL END WEATHERPROOF NETWORK CABLE 1.5M
A62246	SEATALK^{HS} DUAL END WEATHERPROOF NETWORK CABLE 15M
E55058	SEATALK^{HS} NETWORK SWITCH
E55060	SEATALK^{HS} CROSSOVER COUPLER

E55061	SEATALK² NAVIGATION KEYBOARD
A62132	C90W/E90W TRUNNION MOUNTING KIT
A62133	C120W/E120W TRUNNION MOUNTING KIT
A62134	C140W/E140W TRUNNION MOUNTING KIT
R62122	C90W/E90W SUN COVER
R62123	C120W/E120W SUN COVER
R62124	C140W/E140W SUN COVER
R62125	C90W/E90W FLUSHMOUNT KIT
R62126	C120W/E120W FLUSHMOUNT KIT
R62127	C140W/E140W FLUSHMOUNT KIT

G SERIES

R08181	G120 SUNCOVER
R08182	G150 SUNCOVER
R08183	G170 SUNCOVER
E06054	SEATALK^{HS} PATCH CABLE 1.5M
E06055	SEATALK^{HS} PATCH CABLE 5M
E06056	SEATALK^{HS} PATCH CABLE 10M
A62136	SEATALK^{HS} PATCH CABLE 15M
E06057	SEATALK^{HS} PATCH CABLE 20M
E06021	DVI TO DVI (DIGITAL) CABLE (5M)
E06022	DVI TO DVI (DIGITAL) CABLE (10M)
E06053	DVI TO VGA (ANALOGUE) CABLE (0.5M)
R08130	VGA TO VGA CABLE (1.5M)
R08174	VGA TO VGA CABLE (5M)
R08296	VGA TO VGA CABLE (10M)
R08297	VGA TO VGA CABLE (20M)
R08274	GVM400 S-VIDEO CABLE (1.5M)
R08275	GVM400 AUDIO CABLE (1.5M)
R08266	G SERIES AUDIO OUT CABLE (3M)
R08298	G-SERIES AUDIO OUT CABLE (15M)
E22158	IN LINE SEATALK¹ TO SEATALK^{NG} INTERFACE BOX
E55058	SEATALK^{HS} NETWORK SWITCH
E55060	SEATALK^{HS} CROSSOVER COUPLER
E85001	PC/SEATALK/NMEA INTERFACE BOX
E55059	NMEA MULTIPLEXER

RADAR ANTENNAS

M92722	18" RADOME MAST BRACKET
M92698	24" RADOME MAST FIT BRACKET
A55076D	DIGITAL RADAR CABLE (5M)
A55077D	DIGITAL RADAR CABLE (10M)
A55078D	DIGITAL RADAR CABLE (15M)
A55079D	DIGITAL RADAR CABLE (25M)
A92141D	DIGITAL RADAR EXTENSION CABLE (2.5M)
A55080D	DIGITAL RADAR EXTENSION CABLE (5M)
A55081D	DIGITAL RADAR EXTENSION CABLE (10M)

OPEN ARRAYS

A55076D	DIGITAL RADAR CABLE (5M)
A55077D	DIGITAL RADAR CABLE (10M)
A55078D	DIGITAL RADAR CABLE (15M)
A55079D	DIGITAL RADAR CABLE (25M)
A92141D	DIGITAL RADAR EXTENSION CABLE (2.5M)
A55080D	DIGITAL RADAR EXTENSION CABLE (5M)
A55081D	DIGITAL RADAR EXTENSION CABLE (10M)

SATELLITE TV

E42172	33STV EMPTY DOME & BASE PLATE
E96016	37STV EMPTY DOME & BASE PLATE
E96009-V	45STV EMPTY DOME/BASE PACKAGE
E96013	60STV EMPTY DOME AND BASEPLATE PACKAGE
E96006	45STV PWR SUP CBLE TO ACU 30M
E96007	45STV CABLE ACU TO ANTENNA(30M)
E96008	45STV RF CABLE ACU-SAT RX(30M)

COMMUNICATIONS

E46026	HS RELOCATION KIT
M95435	HAILING HORN
M95997A	RAY-430 LOUDHAILER(DISP ONLY)
M95998	INTERCOM SPEAKER RAY430
M95997	RAY-430 LOUDHAILER
E46038	TYPE D POWER ADAPTOR - UK
E46039	TYPE C POWER ADAPTOR AUS/NZ
E46041	TYPE B POWER ADAPTOR, EU
A46051	RAYMIC 2ND STATION INC 10M CABLE-RAY 218/55
A46052	RAYMIC 2ND STATION INC 10M CABLE-RAY 218/55E
A46054	MIC RELOCATION KIT 5M 218/55/E
A46055	RAYMIC EXT CABLE 5M/218/55/E
A46056	RAYMIC EXT CABLE 10M 218/55/E
A46060	FRONT FLUSH MOUNT KIT 218/E
A46053	REAR FLUSHMOUNT KIT 218/49E
A42119	FLUSH MOUNT KIT, RAY55 - FRONT MOUNTING TYPE
E45001	RAY240 US 2ND STATION - HANDSET, CRADLE, SPEAKER, 5M CABLE
E45002	RAY240 EU 2ND STATION - HANDSET, CRADLE, SPEAKER, 5M CABLE
E45003	RAY240 ACTIVE SPEAKER
E45009	RAY240 HANDSET US
E45010	RAY240 HANDSET EU
E45011	RAY240 3M EXTENSION CABLE
E45012	RAY240 5M EXTENSION CABLE
E45013	RAY240 10M EXTENSION CABLE
E45014	RAY240 BULKHEAD MOUNTING KIT

FISHFINDERS

E65011	DSM300 TO C SERIES CABLE, 10M
E65010	DSM300 TO C SERIES CABLE, 3M
E65009	3M C SERIES DSM CABLE

ST40

D131	SEATALK CABLE AND JUNCTION BOX
D284	1M SEATALK EXTENSION CABLE
D285	3M SEATALK EXTENSION CABLE
D286	5M SEATALK EXTENSION CABLE
D287	9M SEATALK EXTENSION CABLE
E25051	12M SEATALK EXTENSION CABLE
D288	20M SEATALK EXTENSION CABLE
E25028	ST40 INTERCONNECT KIT
R08050	SEATALK CABLE
E22158	IN LINE SEATALK¹ TO SEATALK^{NG} INTERFACE BOX

ST60+

A25003-P	ST60+ FLUSH MOUNT KIT
D131	SEATALK CABLE AND JUNCTION BOX
D187	SEATALK MALE CONVERSION CABLE ST50-ST60
D188	SEATALK FEMALE CONVERSION CABLE ST50-ST60
D244	ST60+ 3 WAY JUNCTION
D284	1M SEATALK EXTENSION CABLE
D285	3M SEATALK EXTENSION CABLE
D286	5M SEATALK EXTENSION CABLE
D287	9M SEATALK EXTENSION CABLE
E25051	12M SEATALK EXTENSION CABLE
D288	20M SEATALK EXTENSION CABLE
E25009	ST60+ C.U MOUNTING BRACKET
D147	TRANSOM MOUNT RELEASE BRACKET
D216	50M WIND MASTHEAD CABLE + BLOCK
D240	ROTAVECTA TX CUPS AND SCREWS SERVICE KIT
E26033	AUXILIARY ALARM 15511
E28081	MASTHEAD TRANS SERVICE KIT (D)
R08050	SEATALK CABLE
E22158	IN LINE SEATALK¹ TO SEATALK^{NG} INTERFACE BOX

ST70

E22106	ST70 DEPTH TRANSDUCER POD
E22107	ST70 SPEED TRANSDUCER POD
E22108	ST70 WIND TRANSDUCER POD
A25062	ST^{NG} BACKBONE KIT
A06028	ST^{NG} T-PIECE
A06030	ST^{NG} EXTENDER
A06031	ST^{NG} BACKBONE TERMINATOR
A62232	ST^{NG} SPUR DUST CAP
A06033	ST^{NG} BACKBONE CABLE 400MM
A06034	ST^{NG} BACKBONE CABLE 1M
A06035	ST^{NG} BACKBONE CABLE 3M
A06036	ST^{NG} BACKBONE CABLE 5M
A06068	ST^{NG} BACKBONE CABLE 9M
A06037	ST^{NG} BACKBONE CABLE 20M
A06038	ST^{NG} SPUR CABLE 400MM
A06039	ST^{NG} SPUR CABLE 1M
A06040	ST^{NG} SPUR CABLE 3M
A06041	ST^{NG} SPUR CABLE 5M
A06042	ST^{NG} ELBOW SPUR CABLE 400MM
A06045	ST^{NG} TO NMEA2000 (FEMALE) ADAPTOR CABLE
A06046	ST^{NG} TO NMEA2000 (MALE) ADAPTOR CABLE
A06047	ST^{NG} TO ST ADAPTOR CABLE 3-PIN
A06048	ST^{NG} TO ST2 ADAPTOR CABLE 5-PIN
A06049	ST^{NG} POWER CABLE
A06064	ST^{NG} 5-WAY CONNECTOR
A06032	ST^{NG} BLANKING PLUG
A06043	ST^{NG} SPUR TO STRIPPED END CABLE (1M)
A06044	ST^{NG} SPUR TO STRIPPED END CABLE (3M)
A22113	ST60 TO ST70 ADAPTOR KIT
E22059	WIND ANGLE (ANALOGUE) DISPLAY
E22060	COMPASS (ANALOGUE) DISPLAY
E22061	CH/VMG WIND (ANALOGUE) DISPLAY
E22062	RUDDER ANGLE (ANALOGUE) DISPLAY

AUTOPILOTS

E12101	GYROPLUS 2
E12102	SMART HEADING SYSTEM
D001	TILLER PIN (5 PER PACK)
D003	PUSHROD EXTENSION 25MM (1")
D004	PUSHROD EXTENSION 51MM (2")
D005	PUSHROD EXTENSION 76MM (3")
D006	PUSHROD EXTENSION 102MM (4")
D007	PUSHROD EXTENSION 127MM (5")
D008	PUSHROD EXTENSION 153MM (6")
D009	TILLER BRACKET 25MM (1")
D010	TILLER BRACKET 51MM (2")
D011	TILLER BRACKET 76MM (3")
D159	4" TILLER BRACKET
D160	5" TILLER BRACKET
D014	SMALL THREAD TILLER PIN (5P/P)
D021	LONG THREAD TILLER PIN (5 P/P)
D044	PEDESTAL MOUNTING BRACKET KIT
D045	FULCRUM PIN (5 PER PACKET)
D046	CLEVIS MOUNTING BRKT (5 P/PK)
D047	BULKHEAD MOUNTING BRACKET
D098	MICRO C/U MTG BRKT (2 PER PK)
D100	MICRO CLUTCH LEVER KIT
D337	TILLER PILOT PLUG
D338	TILLER PILOT SOCKET
D339	TILLER PILOT PLUG/SOCKET KIT
A15001-P	ST7002 SUN COVER ONLY
D143	BALL JOINT KIT
D174	FLUXGATE CABLE EXTN KIT
D209	5 AMP FUSE C/COMPUTER (5 P/PK)
D228	LINEAR FEEDBACK FITTINGS PACK
D250	ST.STEEL RUD REF BALL PIN
E15022	RUDDER REFERENCE (POTTED) WITH TROPICA BRACKET
D309	MERCRUISER V8 I/O DRIVE BRKT
M81105	RAYPILOT ROTARY RUDDER REFERENCE
M81105A	RAYPILOT RUDDER TRANSDUCER
M81190	RAYPILOT FLUXGATE COMPASS
E15017	ST4000 MK2 WD B'KHEAD FIT. KIT
E15018	ST4000 MK2 WD GOIOT INST. KIT
A06043	ST^{NG} SPUR TO STRIPPED END CABLE (1M)
A06044	ST^{NG} SPUR TO STRIPPED END CABLE (3M)
E85001	PC/SEATALK/NMEA INTERFACE BOX
D236	SEATALK DECK PLUG
A18116	LANYARD FOR WIRELESS CONTROLLERS

CAMERA ACCESSORIES

E06017	5M CAMERA EXTENSION CABLE
E06018	15M CAMERA EXTENSION CABLE
R08200	CCTV SUNCOVER
R08201	CCTV MOUNT
RO8202	CCTV ADAPTOR CABLE

RAYMARINE MANUFACTURER'S WARRANTY

In order to ensure that a Raymarine product continues to operate efficiently and reliably, before use the user should carefully read the Owner's Handbook and follow the advice on the safe and correct operation and use of each Raymarine product. It is recommended that Raymarine products are installed and/or commissioned by a Raymarine certified installer. Installation and/or commissioning by persons other than a Raymarine certified installer may invalidate this warranty.

Important note: All Raymarine products are merely aids to navigation. It is the ultimate responsibility of the user to exercise discretion and proper navigational skill independent of any Raymarine product.

Standard warranty

Subject to the terms, conditions and limitations in this limited warranty ("warranty"), Raymarine new products are warranted to be free from defects in materials and workmanship for the following period (the "Warranty Period"):

VHF radios: 36 months from Date of first purchase.

All other products: 24 months from Date of first purchase.

"Date of first purchase" means the date on which the product was purchased by the first retail customer or where the product was installed and/or commissioned on a new vessel by a Raymarine certified original equipment manufacturer, the date on which the vessel was purchased by the first retail customer. For products installed by a Raymarine certified installer on a vessel already in the customer's possession, the Warranty Period will begin on the date of product installation or commissioning.

"Raymarine certified original equipment manufacturer"; "Raymarine National Distributor"; "Raymarine certified installer" and "Raymarine certified service agent" are certifications given by Raymarine. For details of such certified parties, please refer to **www.raymarine.com**

Raymarine will (at its sole option) repair or replace any product which is (i) proven to be defective in materials or workmanship; and (ii) returned to Raymarine (or its agent) during the Warranty Period in accordance with this warranty. Replacement products may be new or refurbished. Such repair or replacement will be the sole remedy by Raymarine under this warranty. Any repaired or replacement product will be warranted in accordance with this warranty, for the unexpired balance of the Warranty Period on the original product.

Obtaining standard warranty service

To qualify for standard warranty service, the product must be returned to Raymarine or a Raymarine certified service agent within: (i) the Warranty Period; and (ii) 30 days of the alleged product failure. The product must be securely packaged and sent pre-paid, accompanied by:

- an original valid proof of purchase confirming the date of purchase and product supplier or a stamped warranty card completed by the product supplier; and
- the product serial number.

It is recommended that the customer obtains postal insurance for products that are returned under this warranty. Raymarine will not be liable for loss or damage to products in transit to Raymarine.

Onboard warranty service

Where proof of installation and/or commissioning by a Raymarine certified installer can be shown (or onboard warranty service has been purchased separately) Raymarine will authorize limited onboard warranty service to the vessel by the Raymarine certified service agent nearest to the vessel, subject to the limitations and exclusions below.

Certain Raymarine products are not eligible for onboard warranty service unless (i) at the time of alleged product failure, the products are pre-registered with Raymarine and (ii) onboard warranty service is purchased from a Raymarine certified installer at the time of installation. Onboard warranty service is only available to purchase in certain countries. For details of such products and countries please refer to **www.raymarine.com** or contact the nearest Raymarine National Distributor.

With the exception of autopilots, a Raymarine product or system sold in the Americas or the Caribbean that has a Manufacturer's Suggested Retail Price (MSRP) of less than USD $2,500 is not eligible to receive onboard warranty service. Autopilots (other than sport, tiller and wheel pilots) sold in the Americas or the Caribbean are eligible for onboard warranty service irrespective of MSRP. Unless sold as part of a system with an MSRP in excess of USD$2,500, sport, tiller and wheel pilots are eligible for standard warranty only and are not eligible for onboard warranty service.

Obtaining onboard warranty service

To qualify for onboard warranty service, the nearest Raymarine certified service agent should be contacted and onboard service requested by the customer: (i) within the Warranty Period; and (ii) within 30 days of the alleged product failure. At the time of request, the customer must supply the following to the agent:

- an original valid proof of purchase confirming the date of purchase and supplier name or a warranty card completed and stamped by the Raymarine certified service agent/installer;
- proof of installation by a Raymarine certified service agent/installer; and
- the product serial number.

Onboard warranty service will only be performed if the serial number confirms that the product has been installed and/or commissioned by a Raymarine certified installer or that onboard warranty service has been purchased and is valid and in force.

Warranty limitations & exclusions

In addition to any other limitations and exclusions in this warranty, Raymarine is not responsible for, and this warranty does not cover:

- failure or defects due to accident, abuse or misuse, shipping damage, alterations, corrosion, incorrect and/or non-authorized service or improper installation (whether or not by a Raymarine certified service agent) or failure to comply with the Owner's Handbook;
- products where the serial number has been altered, mutilated or removed;
- costs associated with routine system checkouts, software revisions, alignment/calibration, sea trials or commissioning unless required by replacement of parts in the area being aligned;
- repair or replacement of consumable items including (without limitation) fuses, batteries, drive belts, radar mixer diodes, snap-in impeller carriers, impellers, impeller bearings and impeller shafts. A complete list of the consumable items relating to each product can be found in the Owner's Handbook or at **www.raymarine.com**;
- all costs associated with transducer replacement, other than the cost of the transducer itself;
- costs associated with overtime or premium labor work outside normal working hours;
- differences in material, coloring or size that may exist between actual products and the pictures or descriptions of such products in product advertising, literature or on the Internet;
- replacement of missing components from the package of any product purchased through an Internet online auction site;
- fees associated with hauling, shipping or towing a vessel to a Raymarine certified service agent;
- taxi fares, launch or docking fees, aircraft or vehicle rental, meals, customs, shipping, communication charges;
- other travel or transport costs (save for onboard warranty service, where costs of up to 2 hours' auto mileage and tolls of service agent travel time are covered);

Raymarine accepts no responsibility for damage to other equipment, systems or components occasioned by improper or unauthorized connection or use of the product.

Subjecting any Raymarine product to high pressure washing may cause subsequent water intrusion and failure of the product. Raymarine will not warranty product subjected to high pressure washing.

Other Conditions

TO THE EXTENT CONSISTENT WITH LAW, THE FOREGOING WARRANTY IS RAYMARINE'S SOLE WARRANTY. THE PROVISIONS OF THIS WARRANTY ARE IN LIEU OF ANY OTHER WARRANTY, WHETHER EXPRESSED OR IMPLIED, WRITTEN OR ORAL, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

NONE OF RAYMARINE, RAYMARINE'S AFFILIATES OR A RAYMARINE SERVICE AGENT SHALL BE LIABLE FOR ANY INCIDENTAL, INDIRECT, CONSEQUENTIAL OR SPECIAL (INCLUDING PUNITIVE OR MULTIPLE) DAMAGES, NOR SHALL RAYMARINE, RAYMARINE'S AFFILIATES OR A RAYMARINE SERVICE AGENT BE LIABLE FOR ANY LOSS OF PROFIT, BUSINESS, CONTRACTS, OPPORTUNITY, GOODWILL OR OTHER SIMILAR LOSS WHETHER FOR BREACH OF CONTRACT, TORT (INCLUDING NEGLIGENCE) BREACH OF STATUTORY DUTY OR OTHERWISE. THE LIABILITY OF RAYMARINE, ITS AFFILIATES, OR A RAYMARINE SERVICE AGENT TO A CUSTOMER UNDER THIS WARRANTY, WHETHER FOR BREACH OF CONTRACT, TORT (INCLUDING NEGLIGENCE), BREACH OF STATUTORY DUTY OR OTHERWISE, SHALL NOT EXCEED US$1,000,000. NOTHING IN THIS WARRANTY SHALL LIMIT THE LIABILITY OF RAYMARINE, RAYMARINE'S AFFILIATES OR A RAYMARINE SERVICE AGENT IN RESPECT OF DEATH OR PERSONAL INJURY CAUSED BY ITS NEGLIGENCE, FRAUD OR ANY OTHER LIABILITY WHICH BY LAW CANNOT BE EXCLUDED OR LIMITED.

SOME JURISDICTIONS DO NOT ALLOW EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES SO THE ABOVE LIMITATIONS OR EXCLUSIONS MAY NOT APPLY. THIS WARRANTY GIVES A CUSTOMER SPECIFIC LEGAL RIGHTS AND THE CUSTOMER MAY ALSO HAVE OTHER RIGHTS, WHICH VARY FROM JURISDICTION TO JURISDICTION.

THIS WARRANTY DOES NOT HAVE THE EFFECT OF EXCLUDING OR LIMITING THE CUSTOMER'S STATUTORY RIGHTS UNDER THE APPLICABLE NATIONAL LEGISLATION. THIS WARRANTY COMPLIES WITH EU DIRECTIVE 1999/44/EC.

Contact details of Raymarine Technical Support and a full list of the names and details of worldwide certified service agents are available at **www.raymarine.com** and in the Owner's Handbook.

This warranty supersedes and replaces all previous warranties and applies to Raymarine products where the Warranty Period begins on or after January 1, 2008.

www.raymarine.com

Whenever you need information on our products, just visit our website **www.raymarine.com**. This site is constantly updated, so you'll find:

- the very latest news
- product information
- software upgrades
- owner's manuals
- Worldwide dealer locations.

Product Information

Visit **www.raymarine.com** to find the ideal Raymarine equipment for your boating needs.

Trademarks

Safety notice

Raymarine products are intended to be used as aids to navigation and must never be used in preference to sound navigational judgement. Their accuracy can be affected by many factors, including environmental conditions, equipment failure or defects, and incorrect installation, handling or use. Only official government charts and notices to mariners contain all the current information needed for safe navigation, and the captain is responsible for their prudent use. It is the user's responsibility to use official government charts, notices to mariners, caution and proper navigational skill when operating any Raymarine product.

The technical and graphical information contained in this catalogue, to the best of our knowledge, was correct as it went to press. However, the Raymarine policy of continuous improvement and updating may change product specifications without prior notice. Therefore, unavoidable differences between the product and this catalogue may occur from time to time, for which liability cannot be accepted by Raymarine.

Raymarine products are distributed and sold worldwide via our extensive distributor network

Distributed by

Algeria: *Genelma-sarl*
(+ 213) 51 941150
(+ 213) 21 966574 fax
chabani_nour@hotmail.com

Antigua: *The Signal Locker*
(+ 1 268) 4601528

Argentina: *Baron, S.R.L.*
(+ 54) 114 580 5556

Austria: *Werner Ober GmbH & Co KG, Yachtelektronik*
(+ 43) 5577 824190
(+ 43) 5577 86061 fax
www.yachtelektronik.at
werner.ober@yachtelektronik.at

Australia: *Raymarine Asia Pty Ltd*
(+ 61) (0) 2 9479 4800
(+ 61) (0) 2 9450 1255 fax
aus.sales@raymarine.com
www.raymarine.com.au

Bahamas: *Merlins Marine Electronics*
(+ 1 242) 367 2163

Bahrain: *A.J.M Kooheji & Sons*
(+ 973) 17 700 007
(+ 973) 17 700 762
marine@ajmkooheji.com
www.kooheji.com

Belgium/Luxembourg: *Radio Holland Belgium N.V.*
(+ 32) 50 559855 (Zeebrugge)
(+ 32) 3 320 1882 (Antwerp)
(+ 32) 3 320 9961 fax
yachting@radioholland.be
www.radioholland.be

Brazil: *Marine Express Importadora Nautica*
(+ 55) 115 035 7165
(+ 55) 115 035 7164 fax

British Virgin Islands: *Cay Electronics Tortola*
(+ 1 284) 494 2400

Bulgaria: *Shiptechnics*
(+ 359) 52 306 434
(+ 359) 52 301 610 fax
shiptechnics@triada.bg

Canada: *CMC Electronics*
(+ 1) 905 607 4262
(+ 1) 604 435 1455

Canary Islands: see Spain

Cape Verde: *BoatCV*
(+ 238) 9 915878
(+ 238) 2 300381 fax
kai@boatcv.com
www.boatcv.com

Cayman Islands: *Harbor House Marina*
(+ 1 345) 947 1307
(+ 1 345) 947 7259 fax

Kirk Marine
(+ 1 345) 946 3575
(+ 1 345) 946 3577 fax

Chile: *Mera Vennik Ltd*
(+ 56) 4 154 1752

Nauticentro LTDA
(+ 56) 2 201 4966

Transmarine LTDA
(+ 56) 225 1973

China: *Sunshine Marine Electronics Co. Ltd*
(+ 86) 592 261 9898
(+ 86) 592 261 9900 fax
sales@sunshine-marine.com
www.sunshine-marine.com

Colombia: *Todomar – Cartagena*
(+ 57) 5-665-4177
flondono@todomarchl.com
www.todomarchl.com

Costa Rica: *Coastal Marine Electronics*
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Sri Lanka
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21 Manchester Street
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Raymarine Asia Pty Ltd
Suite 301, 2 Minna Close,
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